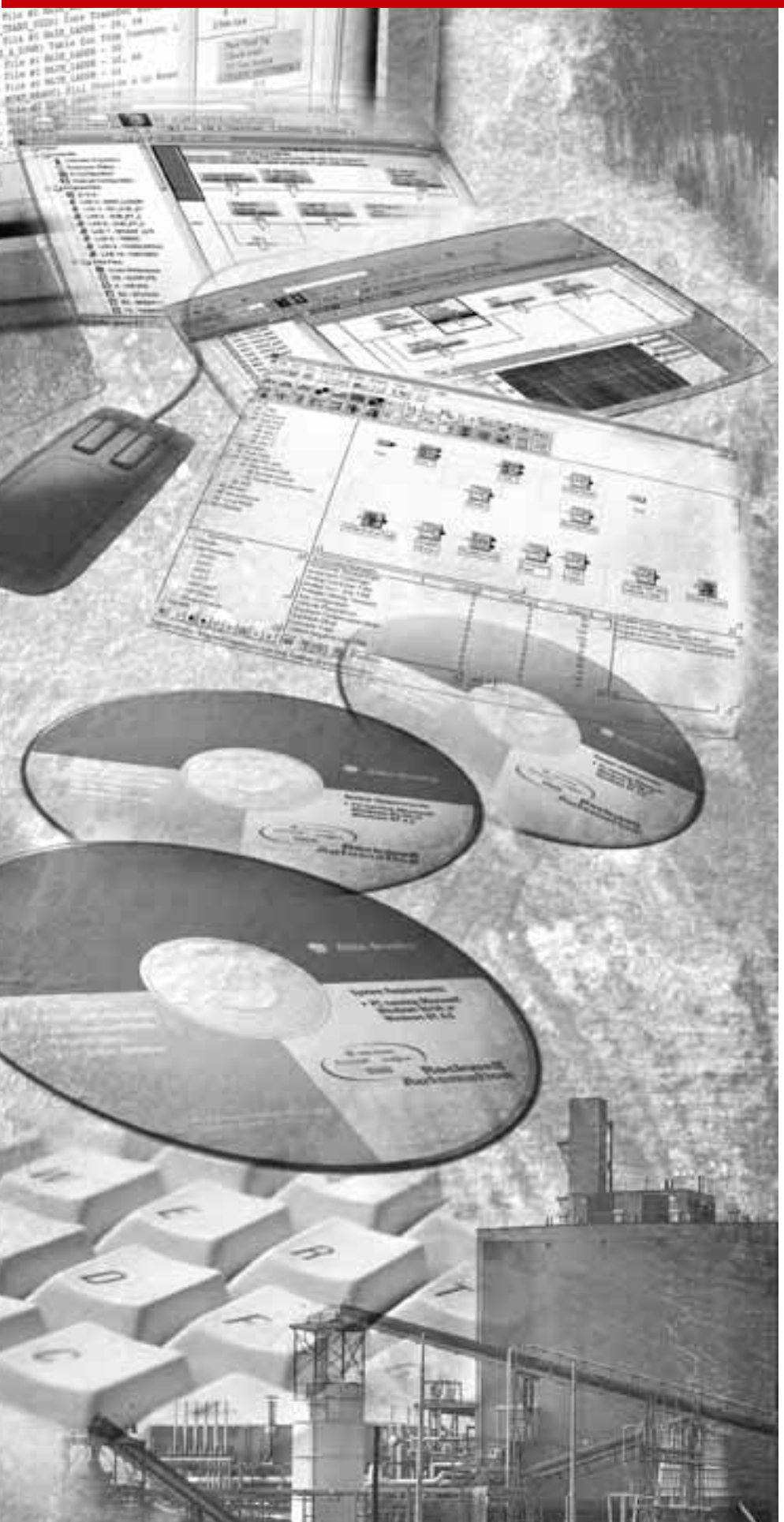

Allen-Bradley

Clutch/Brake Control with MicroLogix Processors

Cat. No. 6556-MLCBK and 6556-MLCBKDC

Rockwell Automation

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this manual we use notes to make you aware of safety considerations:

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss.

Attention statements help you to:

- identify a hazard
- avoid the hazard
- recognize the consequences

Important: Identifies information that is critical for successful application and understanding of the product.

PanelBuilder, PanelView and MicroLogix are trademarks of Rockwell Automation.

Using This Manual

Manual Objectives

This manual describes how to apply the 6556-MLCBK or 6556-MLCBKDC Clutch/Brake (C/B) Control Kit to your mechanical stamping press. The manual helps you install, test, and operate the clutch/brake control.

Qualifications for Applying This Product

Only qualified installers should apply this control to a mechanical stamping press. We assume that the installation team includes:

- a professional stamping press builder or re-builder knowledgeable in press and press control standards
- an electrical technician skilled in installing electronic control equipment

Terms and Abbreviations

You should become familiar with these abbreviated terms. For complete definitions of clutch/brake terms, refer to ANSI B11.1-1988 section 3.

Term	Definition
anti-repeat (ACAM) RCLS	a device designed to limit press operation to a single cycle if the actuating means is held actuated.
bottom position	the part of the press cycle where the dies are closed
brake monitor (BCAM) RCLS	a device designed to prevent the next stroke if stopping time or distance exceeds a preset
buttons	palm-type pushbutton switches used by an operator for starting and stopping the press
clutch/brake valve	the main valve that controls the flow of air to the clutch/brake mechanism
continuous mode	the mode where the control maintains continuous stroking after an operator starts the press
downstroke zone	the part of the press cycle when the press travels from near-top zone (through bottom) to the upstroke zone
fault detection for valves	internal: valve is designed to turn itself off when it faults.
grounded ac power	ac power distribution where the "L2" side of the ac line is grounded
inch mode	a mode that lets an operator move the press incrementally by pressing and releasing run-station buttons
micro-inch mode	a mode that lets an operator move the press incrementally by pressing and releasing run-station buttons using a slower motor
near top zone	the part of the press cycle when the press is at the top of its stroke
RCLS - rotary cam limit switch	a switch that rides a rotating cam to provide information on the position of the press drive shaft

Term	Definition
run station	a press operator's point of operation that typically contains a pair off pushbuttons to start or stop the press
single-stroke mode	a mode that allows the operator to run one complete press stroke, usually started at the top
solenoid valve	an on/off electrically-driven valve
takeover (TCAM) RCLS	a device designed to allow upstroke without the operator holding the run/inch buttons
top stop	a command designed to stop the press at the top of its stroke
upstroke zone	the part of the press cycle when the press travels from the end of downstroke to the near-top position

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Overview

Chapter Objective

The purpose of this chapter is to acquaint you with your Allen-Bradley Clutch/Brake Control (cat. no. 6556-MLCBK). Topics include:

- Contents of the kit
- Control by redundant processors
- Protected memory in MicroLogix-1500 processors
- Modes of operation
- Functional block diagram
- Clutch/Brake control functions
- Panel Switches
- Rotary cam limit switches for position monitoring
- Input switches
- Outputs
- Response time
- Related safety documentation
- Control system specifications

ATTENTION: The clutch/brake control system is designed for use only with mechanical stamping presses having a *part-revolution* friction clutch and/or brake. Applying this control to any other type of press could result in personal injury and/or damage to equipment.

Contents of the Kit

Clutch/brake control kit (cat. no. 6556-MLCB or -MLCBDC) includes:

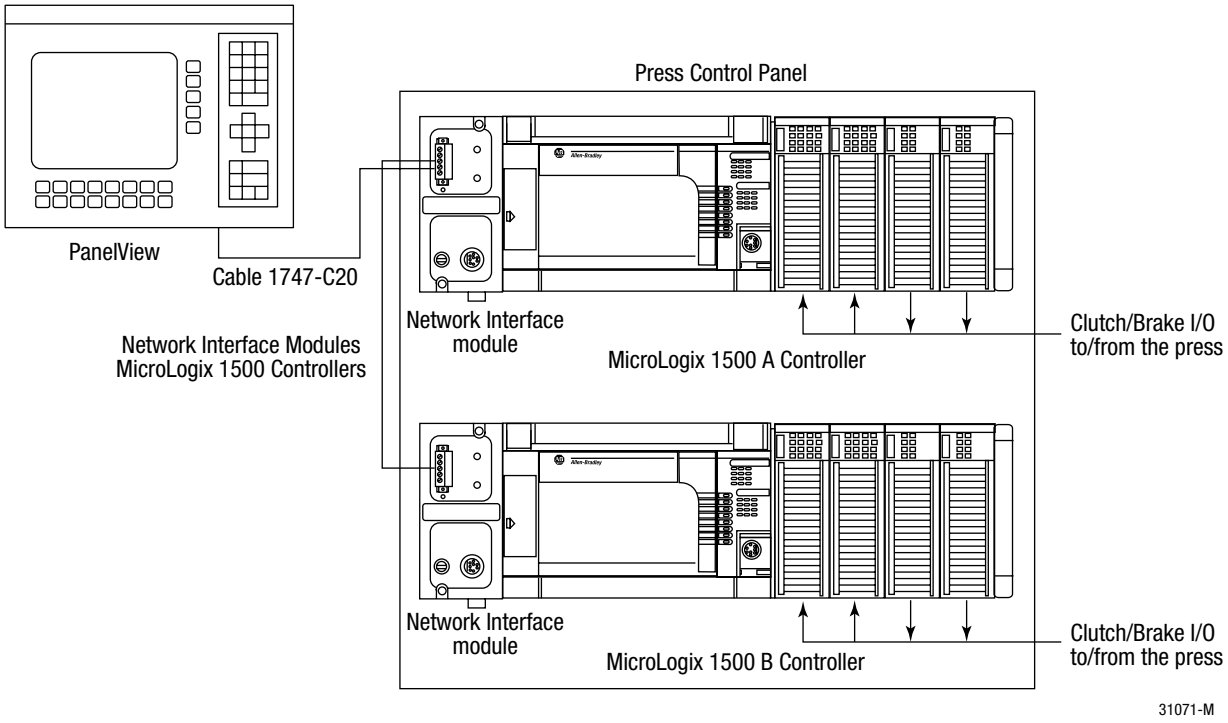
Hardware Included	for -MLCBK	for -MLCBKDC	Hardware That You Provide
Micrologix 1500 Processor	1764-LSP (2)	1764-LSP (2)	• Input Switches and Run Stations (Application Dependent) • Rotary Cam Limit Switches (2 sets) • Solenoid Valves (4) with Internal Fault Detection • Operator Interface (1) - PanelView 550 (6556-PV550) or (6656-PV600)
DC Base W/ DC 16IN/ 12OUT	1764-28BXB (2)	1764-28BXB (2)	
Memory Module w/ Real Time Clock	1764-MMIRTC (2)	1764-MMIRTC (2)	
16 pt Input Module 8 pt Input Module	1769-IA16 (ac) (2) 1769-IA8I (ac) (4)	1769-IQ16 (dc) (6)	
8 pt AC/DC Isolated Relay Module	1769-OW8I (ac/dc) (4)	1769-OW8I (ac/dc) (4)	
Compact I/O Terminator Cap RT	1769-ECR (2)	1769-ECR (2)	
Safety Relay See Pg. 2-1	440R-ZBR520AZ1 (1)	440R-ZBR520AZ1 (1)	

Important: The purchase of this kit includes the license to use this control on *one* stamping press.

Control by Redundant Controllers

This clutch/brake control uses two independent MicroLogix-1500 controllers A and B.

Both controllers monitor all clutch/brake I/O and exchange information about machine status. They are linked by hardwired I/O so that if one controller detects a condition different from that detected by the other, its control logic is designed to declare a fault and turn off all outputs to press valves. The other controller is designed to follow suit.



Protect Memory in MicroLogix 1500 Processors

The logic of this control is pre-programmed and burned into processor memory at the factory. It cannot be changed except by return to Allen-Bradley. This Protect Memory is pre-installed into the MicroLogix 1500 Processor.

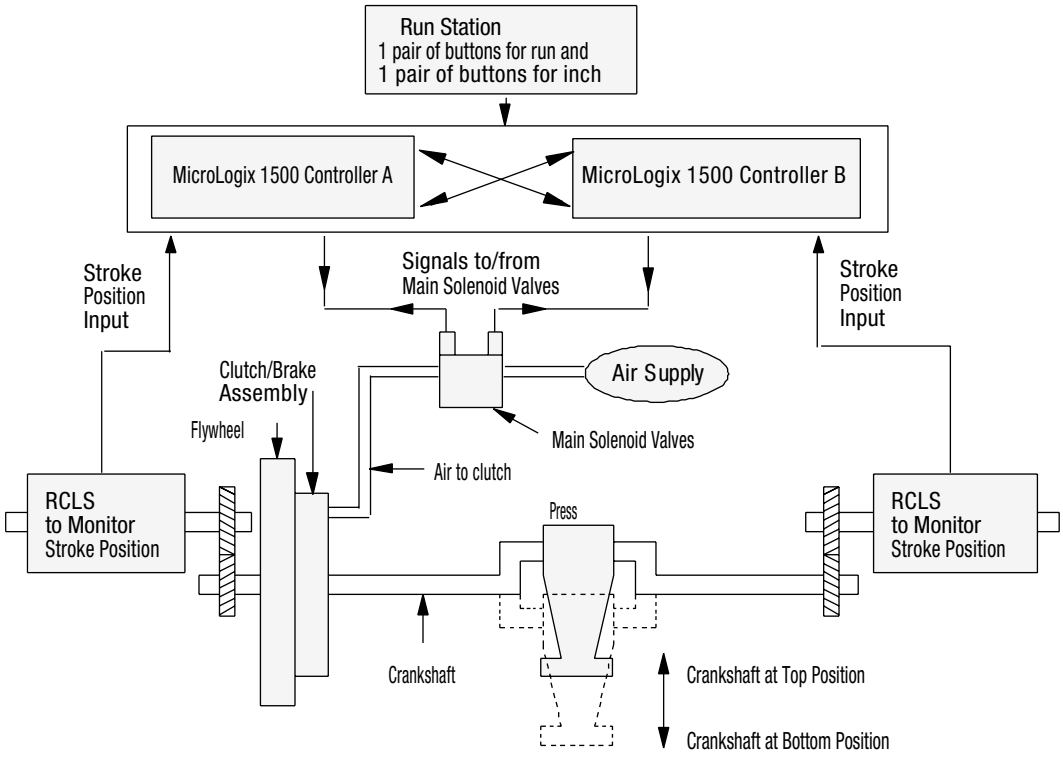
Modes of Operation

The operator can select the mode of operation with the selector switch located on a control panel. In accordance with ANSI B11.1 Section 4.12.4.1, the selection of operating mode must be capable of supervision (lockable).

This Mode:	Lets the Operator:
Off	Disable operation of the clutch/brake control when the press is not in operation.
Inch	Jog the press through successive parts of the cycle by pressing and releasing the pair of inch buttons. If the buttons are held, the press will stop at the top of its stroke.
Single-stroke	Run the press through one complete cycle by holding both run buttons until completion of the down stroke.
Continuous	Run the press continuously until stopped by a stop-on-top command, or until a fault is detected. To start the press, you press the ARM CONTINUOUS switch and then press the pair of run buttons within five seconds.
Micro Inch	Jog the press through successive parts of the cycle by pressing and releasing the pair of inch buttons using a slower motor. If the buttons are held, the press will stop at the top of its stroke.

Functional Block Diagram

The functional block diagram in shows the relationships between mechanical components of a stamping press and the C/B control.



Clutch/Brake Control Functions

Clutch/brake control functions are summarized in the following table.

Control Function:	Operating Mode:	Description:
Stop-on-top (cycle stop)	Continuous	Lets the operator stop the press at top of stroke
Interrupted stroke	Single-stroke or Continuous	Lets the operator stop the press by releasing a run/inch button during downstroke.
Anti-tie-down	All	Prevents the press from starting a new stroke if the control detects that an operator has tied down the run/inch buttons. After run/inch buttons are released, the operator must press both buttons at the same time.
Anti-repeat	Single-stroke Inch or Micro Inch	Limits press operation to a single stroke, even if the operator continues to press both run/inch buttons. The operator must release and press them again to start the next stroke.
Motion detector	Single-stroke or Continuous	Detects press motion from a hardware or software input.
Brake Monitor	All	Prevents restarting the press when the control detects an over-travel condition.

Panel Switches

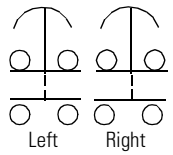
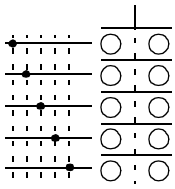
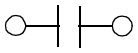
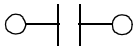
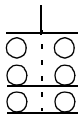
Typically, your control panel would have these switches: 5-position key- lockable mode selector, E-stop, cycle stop, control reset, and C/B power reset. You purchase them separately. For more information, see the table below.

Rotary Cam Limit Switches

You will need two pairs of rotary cam limit switches. We recommend Allen-Bradley Cat. No. 803-PR775 in catalog page 13-1 that you purchase separately.

Input Switches

The clutch/brake control requires input switches listed below: You purchase them separately.

Device	Symbol	Purpose	Type	Allen-Bradley Type	Qty
Palm Buttons for Run Station		• Lets press operators start the press • Assures 2-hand operation Note: Position run/inch buttons at least 24" apart., and the run station in accordance with ANSI B11.1 appendix A.	Momentary pushbuttons dual contact normally closed (N.C.) and normally open (N.O.)	(2) Articulated Palm Buttons 800P-F2CA or 800Z-HLZY	1 pair
Stop on Top		• Stops press at top during continuous stroking • No effect in single mode	Momentary pushbutton single N.C. contact	Yellow Mushroom-head 800T-D9B	1
E-Stop		• Stops the press immediately Note: Wire switches in series as needed.	Momentary pushbutton single N.C. contact	Jumbo Mushroom-head 800T-FXP16RA5	1 or more
Mode Select		• Lets you select the operating mode: Off Inch Single Continuous • Micro Inch	Rotary, 5-position key lockable	N/A	1
Arm Continuous		• Lets you begin a timed interval within which to start continuous mode.	Momentary pushbutton single N.O. contact	Black Momentary Pushbutton 800T-A2A	1
Main Motor Forward Interlock		• Monitors whether motor-forward starter is engaged. If not, it opens to prevent running the press in single or continuous mode.	N.O. auxiliary contact for forward motor starter	Motor Starter Auxiliary Contact 595-A	2
Air Pressure		• Monitors Clutch/Brake air pressure. Note: Switch must be ON to engage the clutch.	N.O. single throw from pressure switch	Pressure Switch 836-C8JX321	1
Motion Detector Interlock		• Detects if motion is stopped in single or continuous mode.	N.O. single contact	N/A	2
Control Reset		• Lets you manually reset power to valve solenoids at power up or after an E-stop.	Momentary pushbutton single N.O. contact	800T-A2A	1
Clutch/ Brake Power Reset		• Lets you manually reset clutch power on power up or after E-stop.	Momentary pushbutton triple contact 1 N.O. and 2 N.C.	800T-A2B	1

Outputs

The clutch/brake control has two pairs of outputs from each I/O chassis (chassis A and B) for your clutch/brake valves.

Important: The control is designed to operate with valves that have *internal* fault detection. There are no inputs for valve-stem feedback. Examples of dual solenoid safety valves with internal fault detection are the Herion XSz Series or Ross SERPAR Crossflow Double Valve with L-G Monitor.

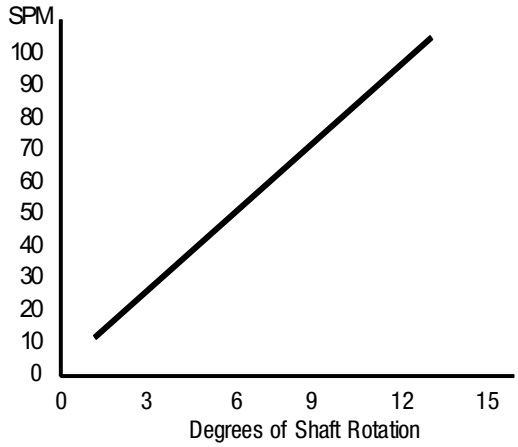
Response Time

The worst case time required for the clutch/brake control to respond to a change of input depends on the sum of these response times:

Device:	Delay (ms):
Input Module 1769-IQ16 response time	8
Processor scan of C/B code (2k words)	3
Output Module 1769-OW8I switching time	10
Total worst-case response time	21

The number of degrees that the shaft continues to rotate beyond the moment at which the input changes depends on the speed of rotation. The greater the speed (strokes per minute), the further the shaft rotates before a command from the control is applied. We graphed the degrees of shaft rotation vs. press speed for a response time of 21 ms.

Figure 1.1 Figure 1.3
Shaft Rotation for a 21 ms Response Time of the Clutch/Brake Control System



Important: When estimating the braking distance in degrees of rotation, you must add the rotation occurring during system response time to the specified downstroke braking distance. (For example, at 100 SPM, the shaft rotates *12°* during a 21 ms system response time plus the braking distance.)

Related Safety Information

You are responsible for the safety of the installed press control, and for meeting all applicable laws, codes, and safety requirements. This control deals only with electrical control portions of the clutch/brake mechanism.

ATTENTION: The installer of this control must follow ANSI B11.1 regarding mechanical power presses, OSHA 1910.217, and other applicable standards pertaining to safety recommendations related to:

- machine construction
- general electrical
- machine guarding
- point-of-operation guards, light curtains gates, 2-hand switches

In addition to local codes and laws, you are responsible for the safety recommendations detailed in all applicable codes and standards including:

- OSHA Regulations, Title 29-Labor, Chapter XVII, Section 1910.217, Mechanical Power Presses (Available at www.osha_slc.gov/OshStd-data/1910_0217.html)
- ANSI B11.1, American National Standard for Machine Tools, Mechanical Power Presses, Construction, Care, and Use (available from American National Standards Institute, 1430 Broadway NY, NY 10018-3363 or http://web.ansi.org)
- NFPA No. 79, Electrical Standard for Metalworking Machine Tools
- IEC 61508, Part 1-7 Functional Safety of a PES Safety Related System
- EN 692 Mechanical Press Safety
- CAN/CSA-Z142-M90 Code for Punch Press and Brake Press Operation: Health, Safety, and Guarding Requirements (Canadian Standards Assoc. 178 Rexdale Blvd. Rexdale (Toronto) Ontario Canada M9W 1R3)

Other applicable standards include EN 954 and EN 60204

Also refer to *Important User Information* inside the front cover.

ATTENTION: The clutch/brake system must be powered down at least once a year. This is to allow the systems initialization routines to be checked.

Specifications

Type of processor
- pair of MicroLogix 1500 processors

Type of power:
- grounded ac (6556-MLCBK)
- dc (6556-MLCBKDC)

Mode selections
- off
- inch
- single stroke
- continuous
- micro inch

Valve outputs
- two clutch/brake valves

Type of valves
- internal fault detection

Position monitoring inputs
- two rotary cam limit switch assemblies

Response time
- 21 ms worst case from switched input to turned-OFF output

Machine inputs
- cycle stop
- E-stop

Machine inputs (continued)
- run station (1)
- mode select (rotary switch)
- clutch/brake air pressure
- motor forward interlock
- motion detector interlock
- arm for continuous on demand
- control reset
- C/B power reset

Environmental conditions
- Operating Temperature 0 to 60°C (32 to 140°F)
- Storage Temperature -40 to 85°C (-40 to 185°F)
- Relative Humidity 5 to 95% (without condensation)

Designed to comply with
- ANSI - B11.1
- OSHA - 1910.217
- CSA - CAN/CSA-Z142-M90
- NFPA No. 79

Product Certification

The 6556 MicroLogix Clutch/Brake DC kit (7556-MLCBKDC Version 1.20) has been thirty party certified by TUV for Functional Safety (No. 968/EZ 109.00/00). The 6556 Clutch/Brake control package with MicroLogix Processors is suitable as a control and monitoring system for mechancial presses according to ANSI B11.1 and EN 692/96. The system fulfills the requirements up to SIL 3 according to IEC 61508 and catagory 4 according to EN 954. The system is certified to the following standards:

OSHA regulation 20 CFR 1910.217	DIN V 19250/94
ANSI B11.1/1988	DIN V VDE 0801 A1/01.94
EN 692/96	IEC 61508 (1-7)/2000
EN 292/95	IEC 61131-2/94
EN 954/97	EN 50081-2/94
EN 60204/98	EN 50082-2/95
EN 574/96	

Quick Start

Use this chapter as an abbreviated procedure for setting up the control, or as an overview if you need more information.

Procedure

1.	**Verify That You have All of the Hardware Shipped in the Kit**	**this manual chapter 1**

Hardware Included	for -MLCBK	for -MLCBKDC	Hardware That You Provide
Micrologix 1500 Processor	1764-LSP (2)	1764-LSP (2)	• Input Switches and Run Stations (Application Dependent) • Rotary Cam Limit Switches (2 sets) • Solenoid Valves (4) with Internal Fault Detection • Operator Interface (1) - PanelView 550 (6556-PV550)
DC Base W/ DC 16IN/12OUT	1764-28BXB (2)	1764-28BXB (2)	
Memory Module w/ Real Time Clock	1764-MMIRTC (2)	1764-MMIRTC (2)	
16 pt Input Module 8 pt Input Module	1769-IA16 (ac) (2) 1769-IA8I (ac) (4)	1769-IQ16 (dc) (6)	
8 pt AC/DC Isolated Relay Module	1769-OW8I (ac/dc) (4)	1769-OW8I (ac/dc) (4)	
Compact I/O Terminator Cap RT	1769-ECR (2)	1769-ECR (2)	
Safety Relay	440R-ZBR520AZ1 (1)	440R-ZBR520AZ1 (1)	

2.	**Mount the Network Interface Module and MicroLogix 1500 Base Unit (with processor and memory module pre-installed)**	**publications 1764-5.1 and 1761-5.11**

3.	**Wire the Power Supply on the MicroLogix 1500 Base Unit**	**publication 1764-5.1**

4.	**Wire the Network Interface Module DeviceNet (DNT) or Advanced Interface Convertor (AIC)**	**Publication 1761-5.11**

5.	**Install the Compact I/O Modules**	**this manual chapter 3**

Slot #	Controller A (same for Controller B)	Publication
n/a	MicroLogix 1500 Base Unit (1764-28BXB) with Processor (1747-LSP) and Memory Module w/ Real Time Clock (1764-MMIRTC) pre-installed	1764-5.1
1	Input Module 1769-IA16 (ac) or 1769-IQ16 (dc)	1769-5.1
2	Input Module 1769-IA8I (ac) or 1769-IQ16 (dc)	1769-5.1
3	Input Module 1769-IA8I (ac) or 1769-IQ16 (dc)	1769-5.1

4	AC/DC Isolated 8pt Relay Module 1769-OW8I	1769-5.13
5	AC/DC Isolated 8pt Relay Module 1769-OW8I	1769-5.13
n/a	Compact I/O Terminator Cap RT 1769-ECR	1769-5.9

6.	**Install Input Switches (You wire them in step 9.)**	**this manual chapter 1**

Description:	**Type:**
run station, inch/run	palm button
E-stop	
mode selection	rotary, key-lockable
cycle stop	push button
arm continuous	
E-stop reset	
C/B power reset	
main motor forward	N.O. single contact
motion detector	
air pressure	

7.	**Install Rotary Cam Limit Switches**	**this manual chapter 3**

Set Up or Simulate Rotary Cam Limit Switches as Follows:

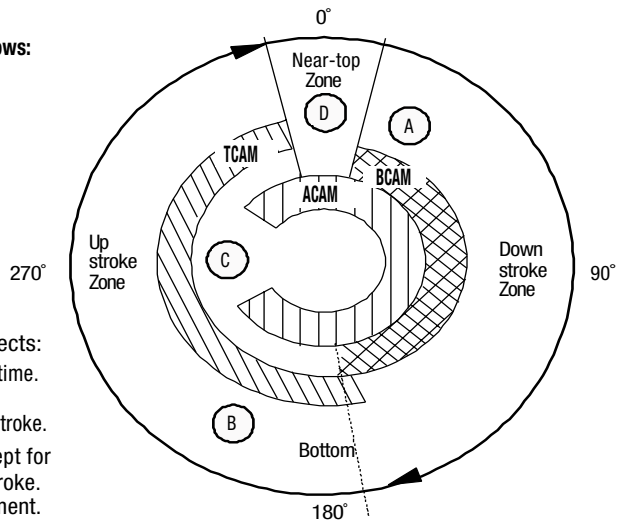
(A) During downstroke, BCAM must be On.
(B) During upstroke, TCAM must be On and BCAM must be Off.
(C) During upstroke, ACAM must cycle from On to Off to On while TCAM is On.
(D) Near top, BCAM and TCAM must be Off while ACAM remains On

Other Conditions:

The software is designed to fault if/when it detects:

a. ACAM, BCAM, and TCAM are OFF all at the same time.
b. BCAM is On when ACAM is Off.
c. ACAM does not cycle while TCAM is On during upstroke.

ACAM should remain On for the entire stroke except for an On/Off/On cycle while TCAM is On during upstroke. Dual sets of contacts need not cycle at same moment. An offset of up to 1 second is acceptable.



Important: See press manufacturer's recommendations for on/off settings of ACAM, BCAM, and TCAM switches.

8.	**Connect the Cables**	**this manual chapter 3**

See the Installation Instructions that accompanied the Network Interface module for the terminations.

Network Interface Module	**Use this cable:**	**to connect:**	**notes:**
DeviceNet	1485C-PI-Cxxx Raw Drop Cable or equivalent	between DeviceNet Interface modules in controller A and controller B	see DeviceNet Interface module installation instructions in Publication 1761-6.5
AIC+ Advanced Interface Converter	that you make	between AIC+ Advanced Interface Converters in controller A and controller B	see Advanced Interface Converter installation instructions in Publication 1761-6.5
DeviceNet or AIC+ Advanced Interface Converter	1761-CBL-AM00	DeviceNet Interface Module to the MicroLogix 1500	came with the DeviceNet Interface module, two required

9.	**Wire the I/O Modules, RCLS, and Input Switches**	**chapter 3 appendix C**

For wiring instructions, refer to chapter 3, Connections to I/O Modules, and to appendix C.

10.	**Test the Wiring and Clutch/Brake Operation**	**chapters 4 and 5**

For instructions on testing the wiring, refer to chapter 4.
For instructions on testing C/B operation, refer to chapter 5

Notes:

Installing and Wiring

Chapter Objective

In this chapter, we help you install the C/B control with these steps:

- check hardware
- mount the network interface and base unit
- wire the power supply
- wire the network interface module
- attach I/O modules
- set up rotary cam limit switches
- install input switches
- connect cables
- connections to I/O modules
- wire your control

Check Hardware

To check the contents of the kit, refer to Contents of Kit in chapter 1. If items are missing, contact your local salesperson or distributor.

Mount the Network Interface Modules and Base Units

To mount the network interface modules and base units:

For	Refer To Publication
DeviceNet Interface Module (1761-NET-DNI) or Advanced Interface Converter, (1761-NET-AIC) Mounting Instructions	1764-5.11 Installation Instructions for DeviceNet Interface Module (1761-NET-DNI) and Advanced Interface Converter (1761-NET-AIC)
MicroLogix 1500 Base Unit (Cat. No 1764-28BXB) mounting instructions	1764-5.1 MicroLogix 1500 Programmable Controller Base Units Installation Instructions

Look for these publications in the boxes that contain the network interface module and base units.

Wire the Power Supply

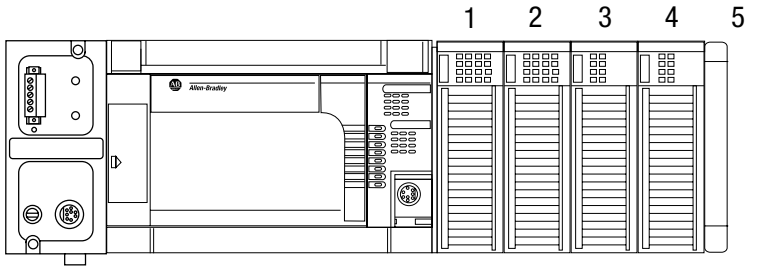
To wire the power supply contained in the base unit (Cat. No. 1764-28BXB), refer to publication 1764-5.1, MicroLogix 1500 Programmable Controller Base Units Installation Instructions. Look for this publication in the box that contains the base units.

Wire the Network Interface Module

To wire the network interface module (DeviceNet Cat. No. 1761-NET-DNI or Advanced Interface Converter Cat. No. 1761-NET-AIC), refer to publication 1761-5.11. Look for this publication in the box that contains network interface module. Keep the instruction sheet handy because you will use it to fabricate and connect cables.

Attach the I/O Modules

Attach the I/O modules in designated sequence for MicroLogix 1500 A and MicroLogix 1500 B as follows:



Location #	DC Controller A (same for controller B)	AC Controller A (same for controller B)
n/a	DeviceNet Interface Module (Cat. No. 1761-NET-DNI) or Advance Interface Converter (Cat. No. 1761-NET-AIC) (customer selection)	
n/a	MicroLogix 1500 Base Unit (Cat. No. 1761-28BXB) containing Processor (Cat. No. 1747-LSP) with Memory Module w/ Real Time Clock (Cat. No. 1764-MMIRTC)	
1	Compact 1769-IQ16 24V dc Sink/Source Input Module	Compact 1769-IA16 120V ac Input Module
2	Compact 1769-IQ16 24V dc Sink/Source Input Module	Compact 1769-IA8I 120V ac Input Module
3	Compact 1769-IQ16 24V dc Sink/Source Input Module	Compact 1769-IA8I 120V ac Input Module
4	Compact 1769-OW8I AC/DC Relay Output Module	
5	Compact 1769-OW8I AC/DC Relay Output Module	
n/a	Compact I/O Terminator Cap RT 1769-ECR	

I/O modules can be attached to the base unit or an adjacent I/O module before or after mounting. For attaching or mounting I/O modules, refer to the following publications installation instructions for that specific module.

For Attaching or Mounting Compact I/O Modules

I/O Module	Refer to Publication
Compact 1769-IQ16 24V dc Sink/Source Input Module	1769-5.3
Compact 1769-IA16 120V ac Input Module	1769-5.1
Compact 1769-OW8I AC/DC Relay Output Module	1769-5.13
Compact RT 1769-ECR I/O Terminator Cap	1769-5.9
Compact 1769-IA8I 120V ac Input Module	1769-5.12

Set Up Rotary Cam Limit Switches

To set up rotary cam limit switches, set up the cam angles for each switch assembly as described below and according to the press manufacturer's installation instructions.

Important: Mount these assemblies on opposite ends of the crankshaft so a mismatch (fault) will occur if the crankshaft breaks.

- brake-monitor (BCAM) contacts close at a point that lets the system detect an increase in braking distance
- take-over (TCAM) contacts close at bottom to let the press complete a stroke, and open during upstroke to let the press stop at the top
- anti-repeat (ACAM) contacts limit press operation to a single stroke in single-stroke mode

This Cam:	In this Mode:	With these Conditions:	Provides a Signal That:
Anti-Repeat (ACAM)	Inch, Micro Inch or Single stroke	Cams open and close in upstroke	Prevents a second stroke in these modes
Take-over (TCAM)	Inch, Micro Inch or Single stroke	Cams open in near-top zone	Turns OFF triac outputs for stopping the press at top of stroke (stop-on-top)
	Continuous	Cams open in near-top zone after stop-on-top command	
	Single stroke or Continuous	Cams close near bottom just when (or before) BCAM opens	Lets the press complete a single stroke or run continuously after run buttons are released
Brake-monitor (BCAM)	Single Stroke or Continuous	When press stops in downstroke beyond BCAM closure	Indicates that braking distance is excessive. Turns OFF solenoid outputs to prevent restart.

Set Up or Simulate Rotary Cam Limit Switches as Follows:

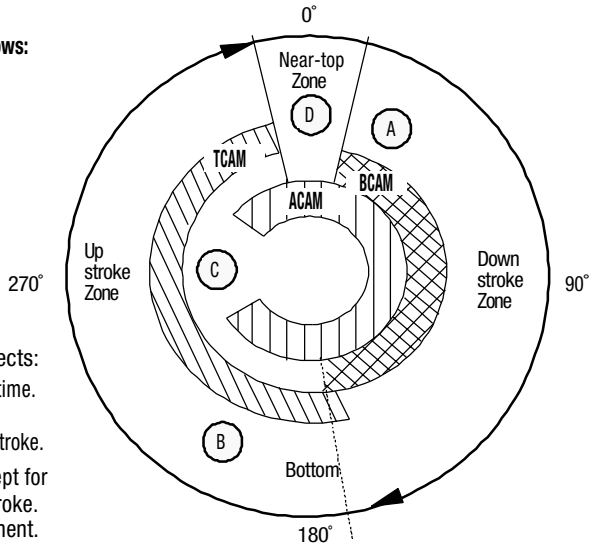
(A) During downstroke, BCAM must be On.
(B) During upstroke, TCAM must be On and BCAM must be Off.
(C) During upstroke, ACAM must cycle from On to Off to On while TCAM is On.
(D) Near top, BCAM and TCAM must be Off while ACAM remains On

Other Conditions:

The software is designed to fault if/when it detects:

a. ACAM, BCAM, and TCAM are OFF all at the same time.
b. BCAM is On when ACAM is Off.
c. ACAM does not cycle while TCAM is On during upstroke.

ACAM should remain On for the entire stroke except for an On/Off/On cycle while TCAM is On during upstroke. Dual sets of contacts need not cycle at same moment. An offset of up to 1 second is acceptable.



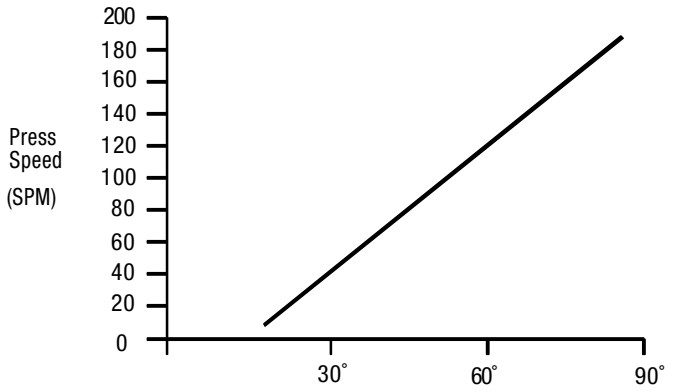
Important: See press manufacturer's recommendations for:
* Near-top Zone
* Bottom
* On/Off settings of ACAM, BCAM, and TCAM switches

As an example, we show typical ON/OFF settings for rotary cam limit switches in the following table where you can write down your initial settings

This RCLS:	Turns ON at a position:	Turns OFF at a position:	Typical ON OFF:	Your [1] ON OFF:
BCAM	• near top, beyond which the software detects a faulty brake	• when overlapped by TCAM in ON position	10^0 190^0	
TCAM	• near bottom • when or before BCAM turns OFF	• that lets the press stop correctly on top • before BCAM turns ON	170^0 350^0	
ACAM	• Remains ON for entire stroke except for an Off span during upstroke (see graph)		290^0 250^0	

[1] **Important:** To determine exact settings, refer to recommendations provided by the press manufacturer.

Set the ACAM off span to the number of degrees (0^0 - 90^0) according to the speed of the press (0-200 strokes per minute).



OFF Span of Anti-repeat Contacts During Up Stroke

Install Input Switches

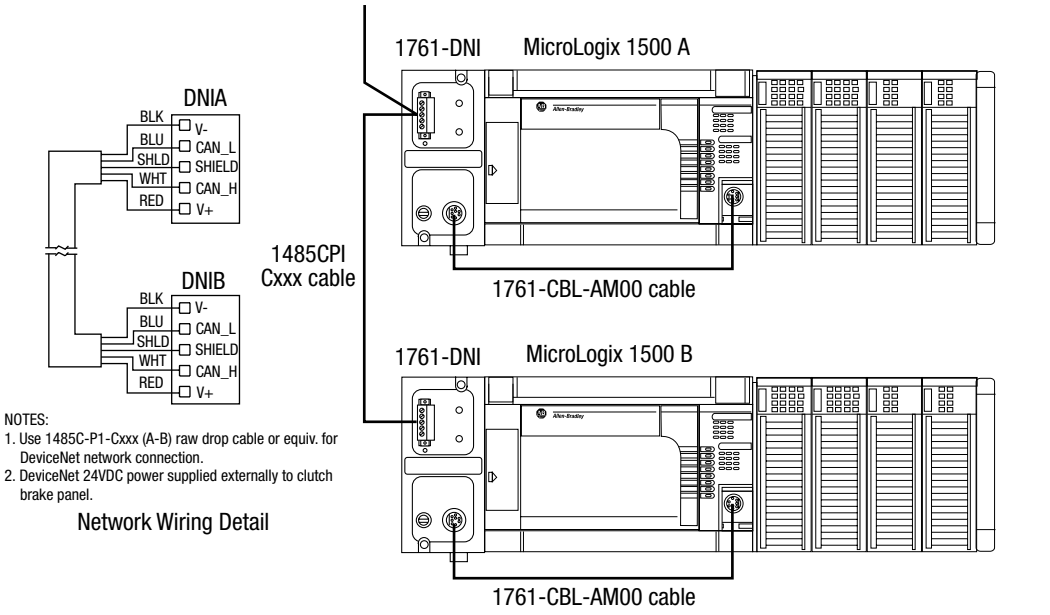
Verify that your press has the following switches. They are required inputs to your clutch/brake control. Refer to chapter 1 for switch specifications.

Description:	Type:
run station, inch/run	palm button
E-stop	
mode selection	rotary, key-lockable
cycle stop	push button
arm continuous	
E-stop reset	
C/B power reset	
main motor forward	N.O. single contact
motion detector	
air pressure	
position monitor	rotary cam limit switches

Connect Cables

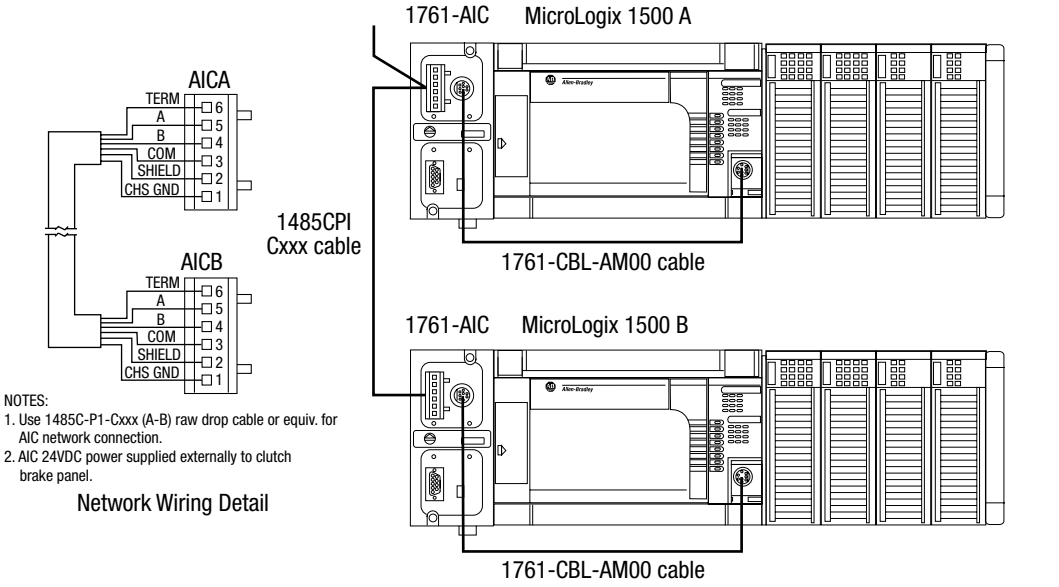
Connect cables as shown:. You must make the cable (1485CPI-PI-Cxxx) that connects between the two network interface modules. Refer to the Network Wiring Detail in each drawing. Use the 1761-CBL -AMOO cable to connect each interface module to the MicroLogix 1500.

Cable Connections for DeviceNet Interface Module



Connect Cable	Use this cable:	notes:
between DeviceNet Interface modules of MicroLogix 1500 A and MicroLogix 1500 B	1485C-PI-Cxxx Raw Drop Cable or equivalent	see DeviceNet Interface module installation instructions in Publication 1761-6.5
between DeviceNet Interface Module and the MicroLogix 1500 Base Unit	1761-CBL-AM00	came with the DeviceNet Interface module, two required

Cable Connections for Advanced Interface Converter

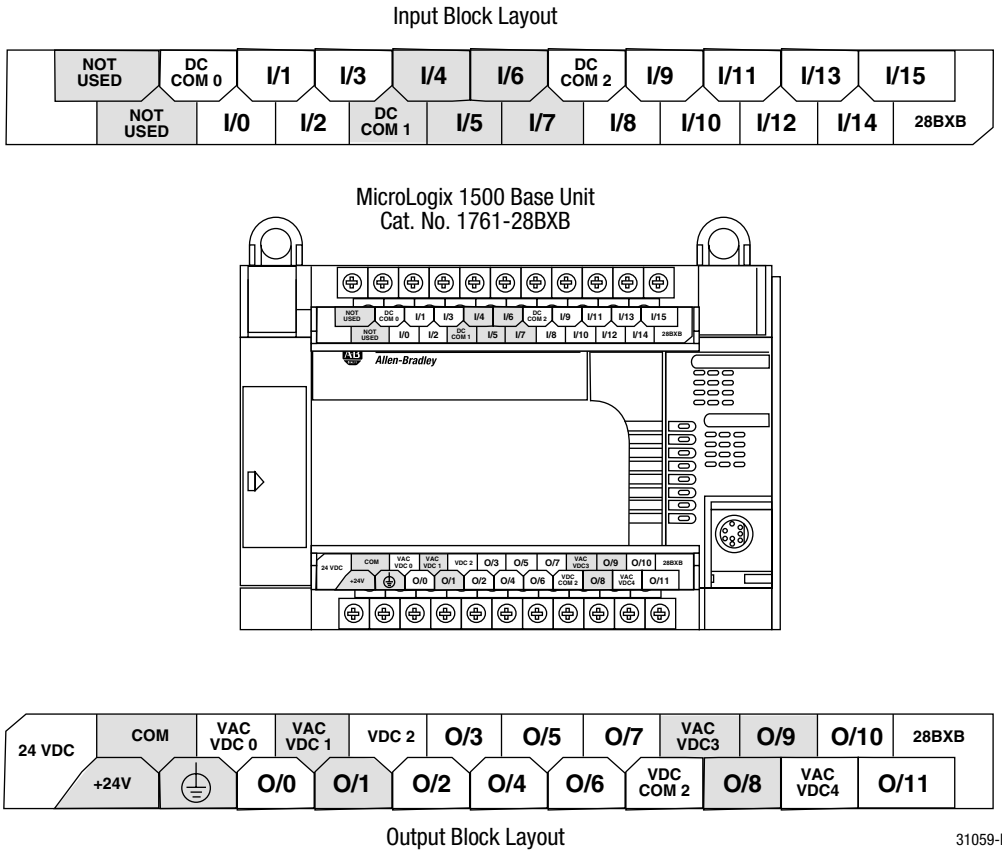


Connect: Cable	Use this cable:	notes:
between Advanced Interface Converters (1761-NET-AIC) of MicroLogix 1500 A and MicroLogix 1500 B	that you make. Refer to Network Wiring Detail in drawing	see Advanced Interface Converter installation instructions in Publication 1761-6.5
between Advanced Interface Converter (1761-AIC+) Interface Module and the MicroLogix 1500 Base Unit	1761-CBL-AM00	came with the Advanced Interface Converter, two required

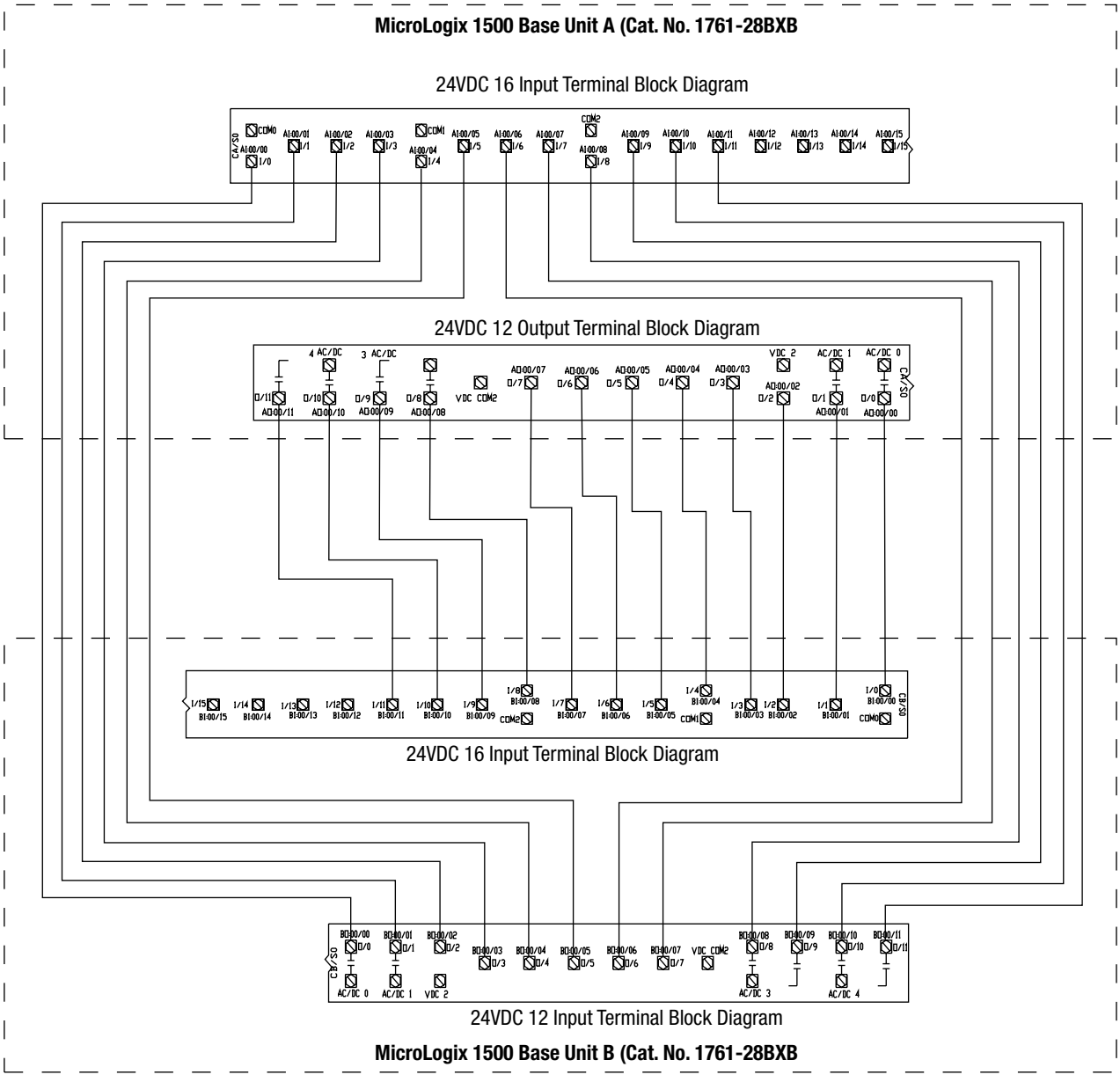
Cross-Check Wiring

Important: Wiring between inputs of controller A of the 1761-28BXB Base Unit and outputs of controller B in the 1761-28BXB Base Unit provides cross-checking between controllers. With cross-check wiring, inputs to the base unit of controller A are wired to outputs in the base unit of controller B, and inputs to the base unit of controller B are wired to outputs in the base unit of controller A.

MicroLogix 1500 Input and Output Block Layouts



Cross Check Wiring Between Processors



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Cross Check Wiring Connection Tables

Wiring Inputs Of Base Unit A To Outputs Of Base Unit B

Base Unit A Input Module Terminal	Base Unit B Output Module Terminal	
I/4	O/0	Controller B Air Pressure
I/5	O/1	Controller B OK to Energize Seal
I/6	O/2	Controller B Clutch Output On
I/7	O/3	Controller B HeartBeat
I/8	O/4	Controller B Anti-Repeat CAM
I/9	O/5	Controller B Brake Monitor CAM
I/10	O/6	Controller B Takeover CAM
I/11	O/7	Spare
I/12	O/8	Controller B Mode (BCD Bit 1)
I/13	O/9	Controller B Mode (BCD Bit 2)
I/14	O/10	Controller B Mode (BCD Bit 3)
I/15	O/11	Main Motor Forward

Wiring Outputs Of Base Unit A To Inputs Of Base Unit B

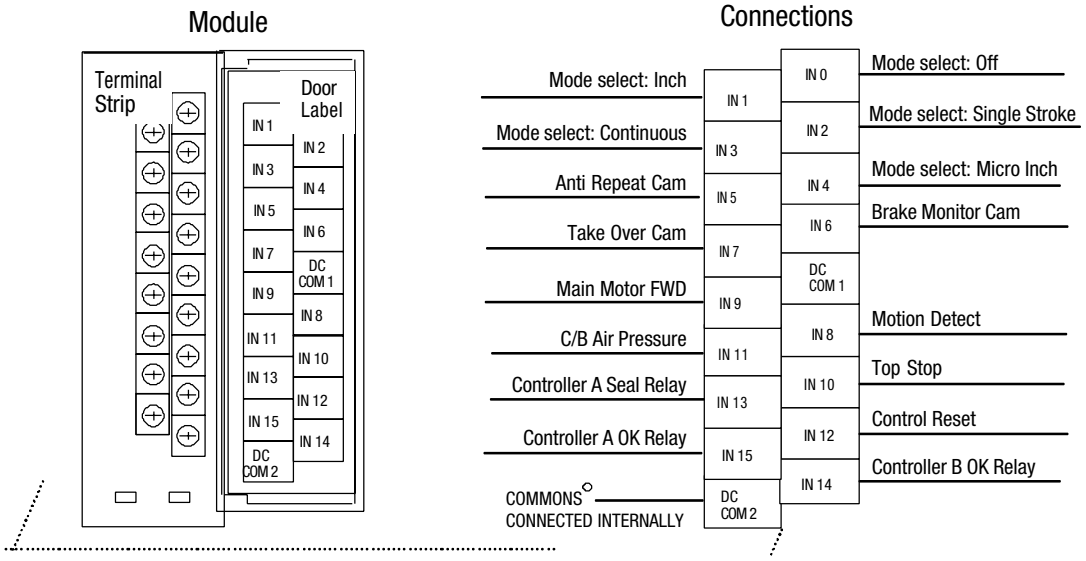
Base Unit A Output Module Terminal	Base Unit B Input Module Terminal	
O/0	I/4	Controller A Air Pressure
O/1	I/5	Controller A OK to Energize Seal
O/2	I/6	Controller A Clutch Output On
O/3	I/7	Controller A HeartBeat
O/4	I/8	Controller A Anti-Repeat CAM
O/5	I/9	Controller A Brake Monitor CAM
O/6	I/10	Controller A Takeover CAM
O/7	I/11	Spare
O/8	I/12	Controller A Mode (BCD Bit 1)
O/9	I/13	Controller A Mode (BCD Bit 2)
O/10	I/14	Controller A Mode (BCD Bit 3)
O/11	I/15	Main Motor Forward

Connections to I/O Modules

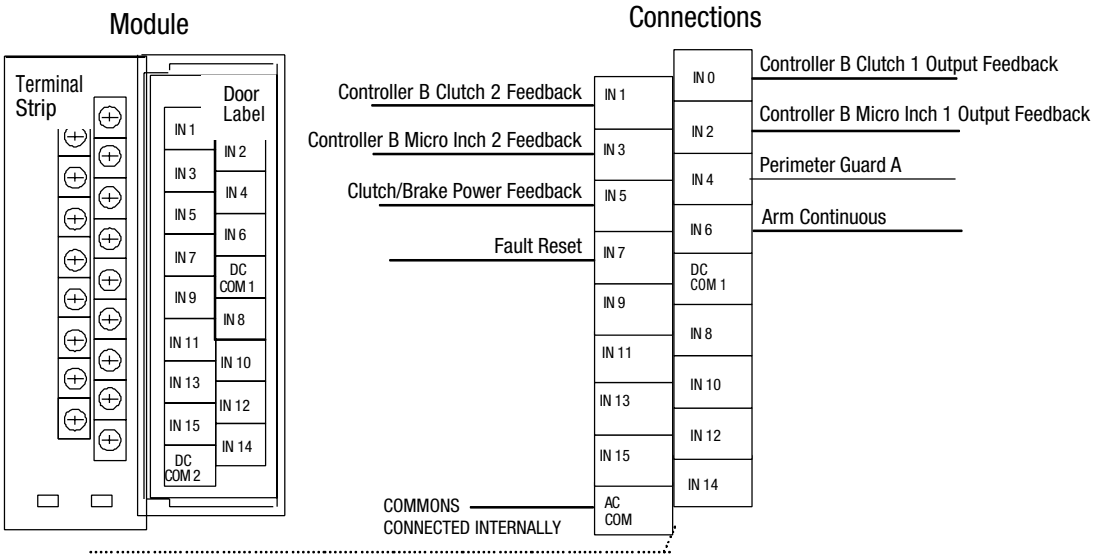
Each I/O module has a removable terminal block for wiring to I/O devices. The label inside the module door identifies the terminals. We present wiring call-outs for each I/O module. Refer to the B-size wiring drawings included in this kit. Modules attached to controllers A and B are wired the same except where noted.

I/O Modules for DC Clutch/Brake Control

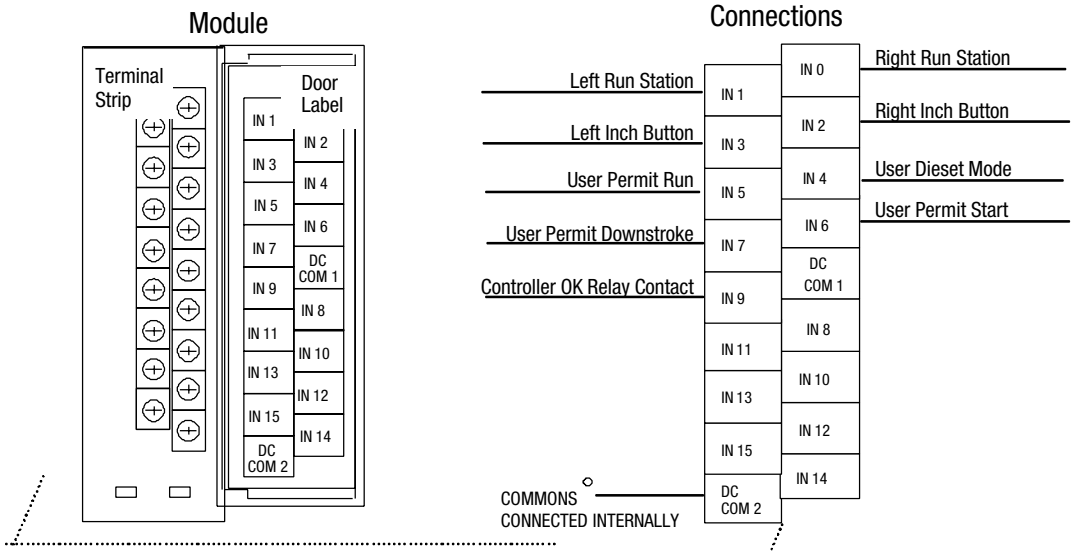
1769-IQ16 (DC) in Slot 1



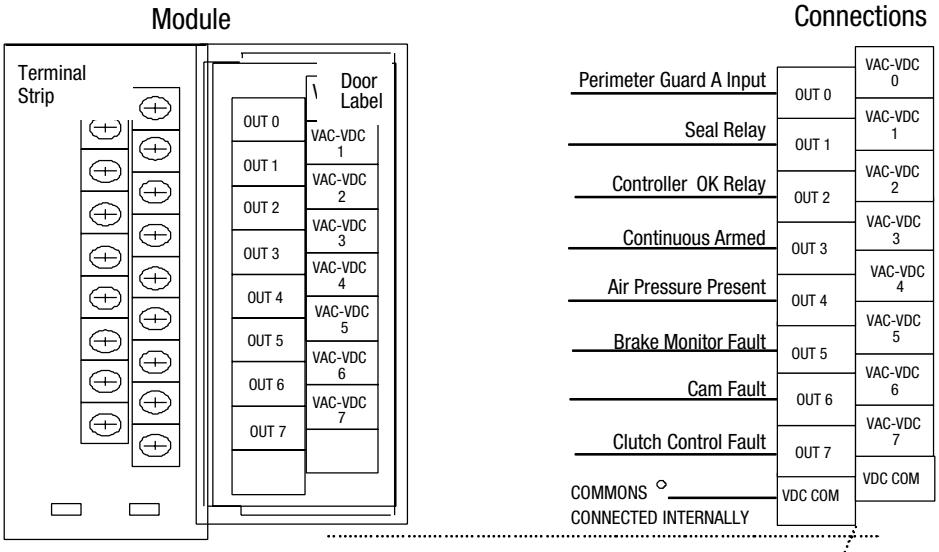
1769-IQ16 (DC) in Slot 2



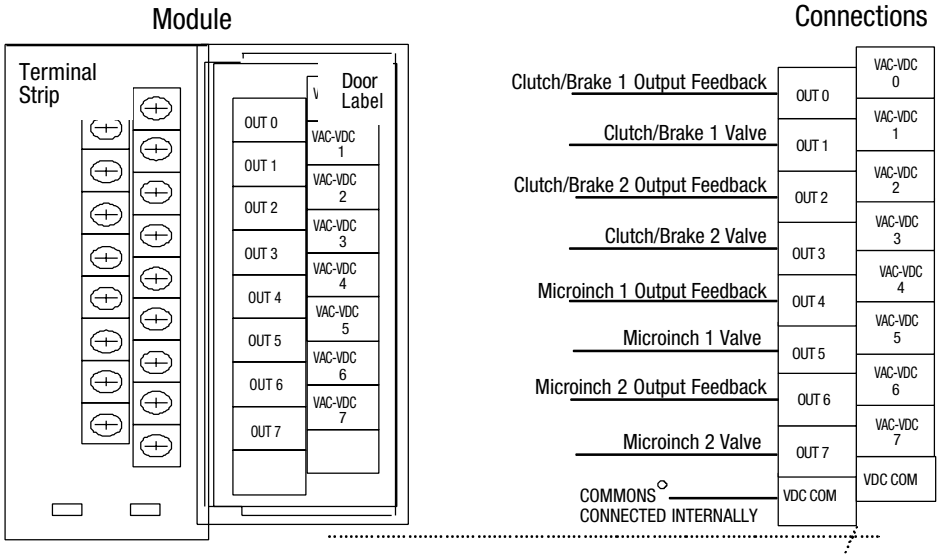
1769-IQ16 (DC) in Slot 3



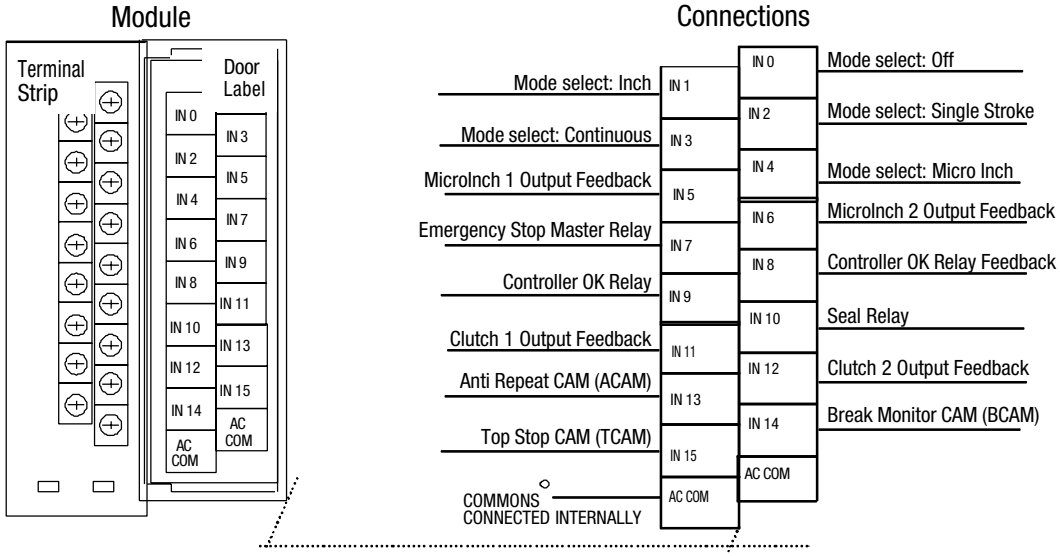
1769-OW8I (AC or DC) in Slot 4



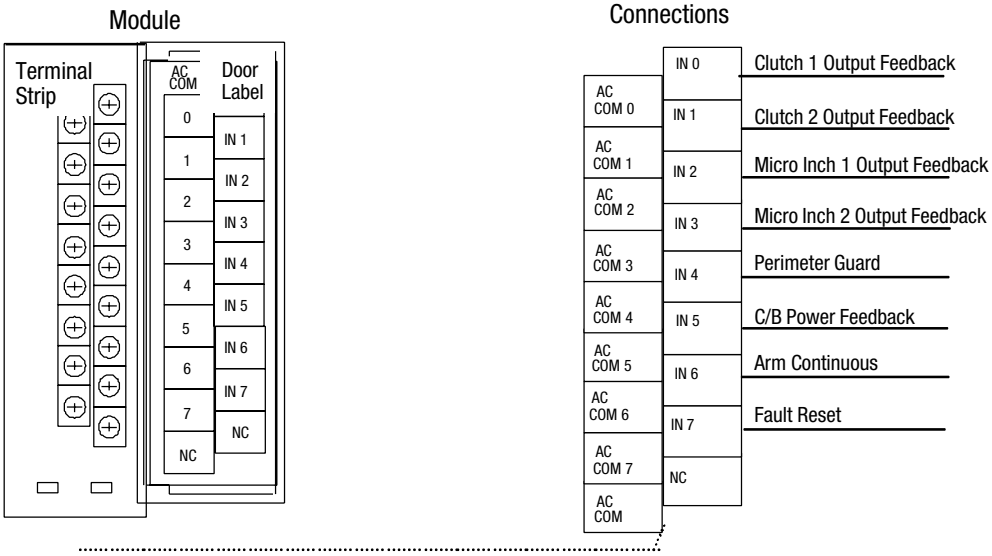
1769-OW8I (AC or DC) in Slot 5



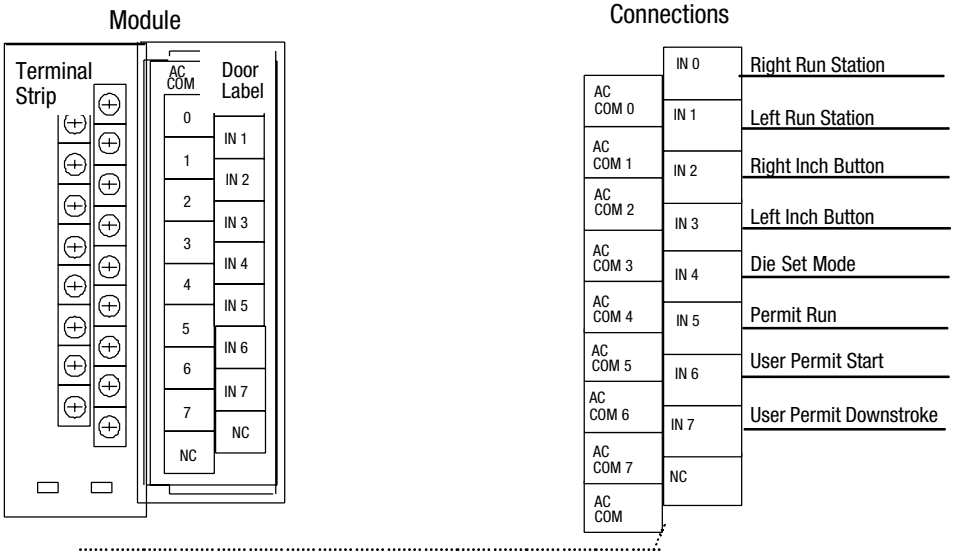
I/O Modules for AC Clutch/Brake Control
1769-IA16 (AC) in Slot 1



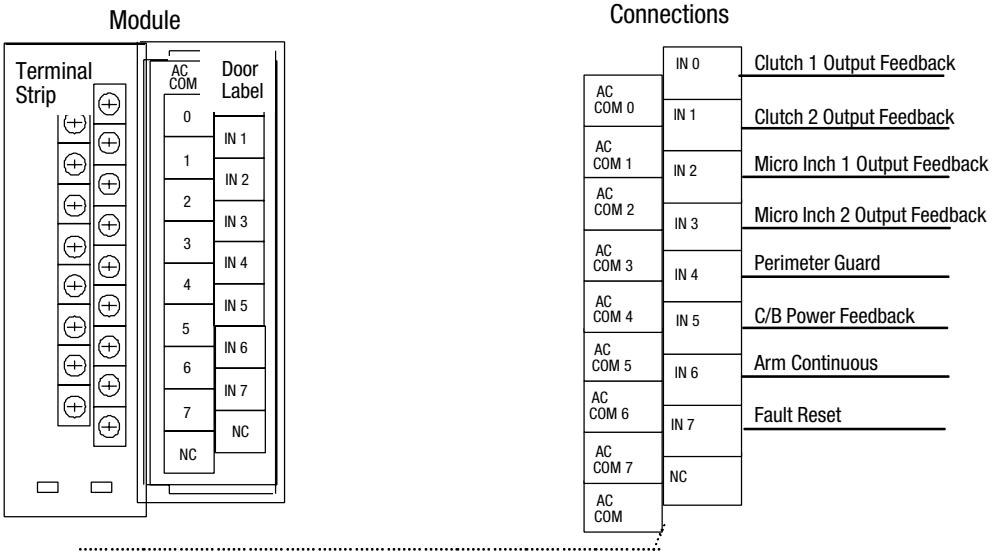
1769-IA8I (AC) in Slot 2



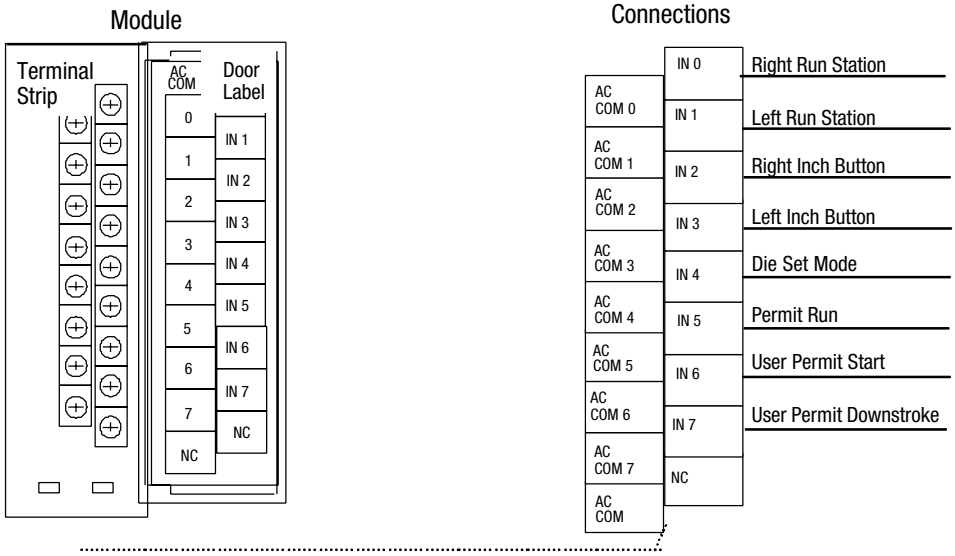
1769-IA8I (AC) in Slot 3



1769-OW8I (AC or DC) in Slot 4



1769-OW8I (AC or DC) in Slot 5



Wire Your Control

We provide the same set of wiring drawings and user manual for both the ac and dc versions of this control. For the dc version (Cat. No. 6556-MLCKBDC), wire your I/O modules and dc power distribution according to those drawings.

Important: For the ac version (Cat. No. 6556-MLCBK), refer to appendix C for modifications you must make to the dc wiring drawings before wiring your I/O modules and power distribution.

Inputs and outputs by I/O module and location are as follows:

For	In I/O Module Location	See Drawing Sheet
Power Distribution	Base unit	1 of 10
Inputs to 1764-28BXB base unit of Controller cross-checked inputs (same as cross-checked outputs, next)	Base unit	2 of 10
Outputs to 1764-28BXB base unit Cross-checked Outputs • OK To Energize Seal • BCD Mode • ACAM,BCAM,TCAM • Clutch Output ON • Heartbeat	Base Unit	3 of 10
Inputs to 1769-IQ16 (dc) or 1769-IA16 (ac) • Mode Select • ACAM, BCAM, TCAM • Motion Detect • Main Motor Forward • Cycle Stop • Clutch/Brake Air Pressure • Emergency Stop Relay • Seal Relay • Controller OK Relays	Slot 1	4 of 10
Inputs to 1769-IQ16 (dc) or 1769-IA8 (ac) • Clutch/Brake 1 Feedback • Clutch/Brake 2 Feedback • Microinch 1 Feedback • Microinch 2 Feedback • Perimeter Guard • Clutch/Brake Power Feedback • Arm Continuous • Fault Reset	Slot 2	5 of 10
Inputs to 1769-IQ16 (dc) or 1769-IA8I (ac) • Left & Right Run Station • Left & Right Run Inch Buttons • User Permits	Slot 3	6 of 10
1769-OW8I (dc or ac) Outputs • Perimeter Guard • Seal Relay • Controller OK Relay • Continuous Arm Light • Air Pressure Light • Brake Monitor Fault Light • Cam Fault Light • Clutch Control Fault Light	Slot 4	7 of 10
1769-OW8I (dc or ac) Outputs • Clutch/Brake 1 Outputs • Clutch/Brake 2 Outputs • Microinch 1 Outputs • Microinch 2 Outputs	Slot 5	8 of 10

Wire power supplies according to instructions that accompanied them.

Notes:

Customer Interface Inputs and Motion Detect Inputs

Chapter Objective

Use this chapter to understand the customer interface inputs and motion detect inputs.

Customer Interface Inputs

Permit Run - I:03/05

The permit run input is used as a permissive to allow the press to run in single stroke or continuous mode. If the permit run input is "off", the press will not be able to start motion. If the press is in motion it will stop immediately.

Important: If you are not using the permit run input, you must wire it high to allow the press to cycle.

Permit Start - I:03/06

The permit start input is used as an initial condition to start the press cycle in single-stroke and continuous mode.

Single Stroke Mode

The input must be "on" to start the press cycle. Once the press cycle starts, the permit start input is not required to be "on".

Continuous Mode

The input must be "on" to start the press cycle. Once the press cycle starts, the permit start input is required to be "on". If the permit start input is turned "off" the press will top stop.

It is also required to be "on" to inch press.

Important: If you are not using the permit start input, you must wire it high to allow the press to cycle.

Permit Downstroke - I:03/07

The permit downstroke input is required in inch, single stroke, and continuous as the last permissive in the logic to start the motion on the press. This permissive is in place after the inch or run buttons have been pressed. This allows the press to stop and restart as long as the operator keeps the inch or run buttons pressed.

Important: If you are not using the permit downstroke input, you must wire it high to allow the press to cycle.

Dieset Mode - I:03/04

When turned “on”, the dieset mode input stops the press at the bottom and then at the top when in inch mode.

Motion Detect - I:0/0

This motion detect input is a pulsed input. You should use this input if your motion detect device produces a square pulse output when it is in motion and no output when the press is stopped. It requires at least 600 pulses per minute.

Ex: @10 SPM must have 60 pulse/stroke to work.

The maximum pulse width should be no greater than 100 msec. The maximum frequency which will be detected is 20 KHz, from this you can determine the minimum pulse width detectable. For the ML1500 C/B code to detect crank “MOTION”, there needs to be AT LEAST 2 pulses DETECTED every 250 msec.

Motion Detect - I:01/08

This motion detect input is a continuous input. You should use this input if your motion detect device produces a high signal when the press is in motion and a low signal when the press is stopped.

Perimeter Guard

The Perimeter Guard input can be used for a manufacturing cell perimeter fence or light curtains. It is intended to act as an e-stop for the press.

Circuit Testing

Chapter Objective

Once you have completed the installation of your clutch/brake control and wired your I/O devices, use this chapter to check circuit wiring.

ATTENTION: Before starting this chapter, be sure that:

- all clutch/brake control hardware is installed
- clutch/brake wiring is complete
- the control is in compliance with all applicable standards

Otherwise, personal injury or property damage could result.

Testing Circuits and Failure-mode Operation

This section describes the following tests:

- Controller OK (failure mode)
- CRM Relay
- Seal Relay (circuit)
- Seal Relay (failure mode)
- Run Station Buttons
- Inch Buttons
- Cycle Stop Button
- Arm Continuous Button
- Mode Selector Switch
- Rotary Cam Limit Switches

Controller OK Test (failure mode)

This test verifies the correct failure-mode operation of the Controller OK relay for controller A. You will repeat this procedure for controller B.

1. With power off, place a jumper across the wired contacts of Controller OK relay (CRAO0402).
2. Power up.
3. Press the C/B Control Reset button to energize the CRM relay.
4. Press (and momentarily hold) the C/B Power Reset button.
5. Verify that:
   - the Controller OK relay is NOT energized (red plunger is not recessed)
   - "Controller OK Check Failed" prompt is displayed on PanelView screen (or equivalent prompt code 003 is displayed on the DTAM display)
6. Shut off system power.
7. Remove the jumper.
8. Repeat steps 1-7 for Controller B (Controller OK relay CRBO0402).

Safety Relay Test (circuit)

This test verifies that pressing the E-stop button will de-energize the seal and safety relays.

1. Power up.
2. Visually and with a voltmeter, verify that:
   - safety relay is *not* energized
   - outputs to all press valves are Off.
3. Reset the E-Stop circuit by pressing the Control Reset button.
4. Visually and with a voltmeter, verify that:
   - safety relay is energized
   - outputs to all press valves are Off
5. Reset control power by pressing the C/B Power Reset button.
6. With a voltmeter, verify that power rails to C/B outputs are energized.
7. Press the E-Stop button.
8. Visually and with a voltmeter, verify that seal relays and safety relay are de-energized.

Seal Relay Test (circuit)

This test verifies that when the seal relay is off, press valves are off; and when the seal relay is on, outputs to press valves are energized.

1. Power up (if not already powered up).
2. Reset the E-Stop circuit by pressing the Control Reset button.
3. With a voltmeter, verify that:
   - seal relay is *not* energized
   - outputs to all press valves do are Off
4. Reset control power by pressing the C/B Power Reset button.
5. Visually and with a voltmeter, verify that:
   - seal relay is energized
   - power rails to C/B outputs are energized
6. Shut off system power.

Seal Relay Test (failure mode)

This test verifies the correct failure-mode behavior of the seal relays for chassis A and B.

1. With power off, place a jumper across the wired contacts of seal relay (CRAO0401).
2. Power up.
3. Reset the E-Stop circuit by pressing the Control Reset button.
4. Verify that:
   - the seal relay is NOT energized
   - Controller OK relay is energized
   - Seal Relay Weld "Fault" prompt is displayed on PanelView (or Fault Code 005 is displayed on the DTAM display).
5. Shut off system power and *remove* the jumper.
6. Restore system power.
7. Reset control power by pressing the C/B Power Reset button.
8. Verify that:
   - safety relay is energized
   - there is NO fault message
9. Press (and momentarily hold) the C/B Power Reset button.
10. Verify that the seal relay is energized
11. Shut off system power.
12. Repeat steps 1-11 for chassis B (Seal Relay CRBO0401)

Test Run Station Buttons

Test the wiring of Run Station buttons by observing LEDs in slot 3. Check each OK- box after verifying that the LED indication is correct.

For This Condition	Slot 3, Controller A Input LED Is OFF	ON	OK?	Slot 3 Controller B Input LED Is OFF	ON	OK?
Right Run Station button is *pressed*		Input 0		Input 1		
Left Run Station button is *pressed*	Input 1			Input 0		
Both Run Station buttons not *pressed*	Input 0	Input 1		Input 0	Input 1	

Test Inch Buttons

Test the wiring of Inch buttons by observing LEDs in slot 3. Check each OK- box after verifying that the LED indication is correct.

For This Condition	Slot 3, Controller A Input LED Is OFF	ON	OK?	Slot 3 Controller B Input LED Is OFF	ON	OK?
Right Inch button is pressed	Input 2			Input 3		
Left Inch button is pressed	Input 3			Input 2		
Both Inch buttons not pressed	Input 2	Input 3		Input 2	Input 3	

Cycle Stop and Arm Continuous Buttons

Test the wiring of these buttons by observing input LEDs.
Check each OK- box after verifying that the LED indication is correct.

Slot	For This Condition	Verify both A and B Chassis Slot 2 Input LED Is OFF	ON	OK?
1	Cycle Stop not pressed		Input 10	
1	Cycle Stop pressed	Input 10		
2	Arm Continuous not pressed	Input 6		
2	Arm Continuous pressed		Input 6	

Test Mode Selector Switch

Test the wiring of this switch by observing input LEDs in slot 1.
Check each OK- box after verifying that the LED indication is correct.

For This Mode-select Position		Slot 1 Input LEDs Are OFF	Slot 1 Input LED Is ON	OK?
Off	(input 0)	A & B: Inputs 0, 1, 2, 3, 4, except for the selected input	A & B, only the selected input	
Inch	(input 1)			
Single	(input 2)			
Continuous	(input 3)			
Micro Inch	(Input 4)			

Test Rotary Cam Limit Switches

Test the wiring of the RCLSs by observing input LEDs in slot 1. Check each OK- box after verifying that the LED indication is correct.

For This Condition	Slot 1 Input LED Is OFF ON	OK?
ACAM, BCAM, TCAM at rest	A & B, Inputs 5, 6, 7	
ACAM, BCAM, TCAM actuated	A & B, Inputs 5, 6, 7	

Notes:

Testing the Operation

Chapter Objective

Once you have checked the wiring of your clutch/brake control, use this chapter to test its operation. Tests include:

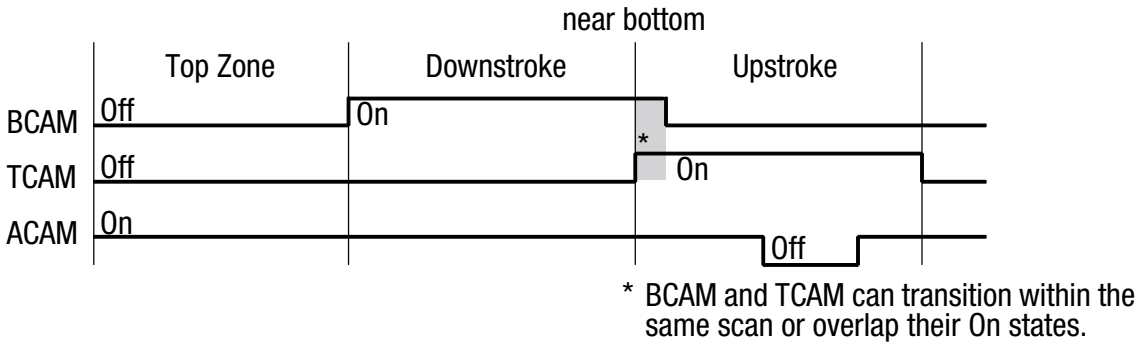
- troubleshoot the setup of your RCLS assemblies
- tests the operating modes
- test the switches

Troubleshooting the Setup of Your RCLS Assemblies

We recommend that you test the rotary cam limit switches (RCLS) in Inch mode. The processor monitors RCLS signals to ensure that the motion progresses through the correct sequence of:

- downstroke
- upstroke
- top zone

During each stroke, rotary cam limit switches must cycle through these zones.



Important: The software reads the zones according to the on/off status of ACAM, BCAM, and TCAM switches that you set mechanically. When the software detects any one of the following fault conditions, it is designed to turn outputs off and set the corresponding fault message #.

Use the following look-up table to take corrective action.

Processor Faults

Msg #	PanelView Message	Cause of Fault	Effect of Fault	How to Correct the Fault
027*	Illegal RCLS Combination	Software/hardware cams produced invalid combination.	Press will stop or not run in single or continuous mode.	Check software cam logic or hardware cams for proper operation or settings.
028*	Forward Transition from Top	Software/hardware cams did not go from near top to downstroke.		
029*	Forward Transition from Downstroke	Software/hardware cams did not enter upstroke.		
030*	Forward Transition from Upstroke	Software/hardware cams did not enter near top zone.		
034*	Forward Shaft Position Transition Faults	Any of 027-030 detected.		
035*	ACAM Upstroke	ACAM did not cycle in upstroke.		
042*	BCAM Mismatch Between Processors	One processor sees the BCAM while the other does not.		
043*	TCAM Mismatch Between Processors	One processor sees the TCAM while the other does not.		
044*	ACAM Mismatch Between Processors	One processor sees the ACAM while the other does not.		
045*	Cam Mismatch Faults	Any of 042-044 detected.		
047*	Brake Monitor Fault	On a top-stop command, the press slid onto BCAM before stopping.	Press cannot operate in single or continuous mode.	Check the brake and brake monitor cam settings.

* To clear this latched fault bit, you must enable the fault reset bit or turn the mode-select switch to OFF.

Testing the Operating Modes

Here are procedures to test dynamic operation of the press in these modes:

- inch
- single-stroke
- continuous with the arm-continuous method to start this mode
- micro inch

Important: If the press control faults or does not operate as expected, read the fault or prompt message (or bit number) and see Appendix B for:

- faults in bit file B168 for troubleshooting
- prompts in bit file B169 for operating the press

Inch Mode

1. Place the mode selector switch in Inch mode.
2. Power up by pressing the Control Reset and C/B Power Reset buttons.
3. Verify that seal relays and CRM relays are energized.
4. Concurrently, press and hold both Inch buttons.
5. Observe that the press cycles and stops on top.
6. Release the Inch buttons and press again for 1-2 seconds.
7. Observe that the press cycles until you release a button, then stops.

Single-stroke Mode

1. Place the mode selector switch in Single-stroke mode.
2. Press and hold Run buttons for more than 1/2 stroke.
3. Observe that the press cycles and stops on top.
4. Release Run buttons and press again. Then release in downstroke.
5. Observe that the press stops immediately.
6. Bring the press to top by pressing Run buttons and release in upstroke.
7. Repeat steps 2 and 3. This time hold Run buttons for the entire cycle.
8. Observe that the press runs through one stroke and stops at the top.

Continuous Mode with Arm Continuous

1. Place the mode selector switch in Continuous mode.
2. Press the Arm Continuous button.
3. Immediately press Run buttons and release after downstroke.
4. Observe that the press continues to cycle.
5. Press the Cycle Stop button.
6. Observe that the press completes the cycle and stops on top.
7. Return to step 2 and press the Arm Continuous button.
   This time, wait for 5 seconds (or until the Arm-continuous timer has timed out) before pressing Run buttons.
8. Observe that the press does not start.
9. Repeat steps 2 through 6 for a final verification.

Micro Inch Mode

1. Place the mode selector switch in Micro Inch mode.
2. Power up by pressing the Control Reset and C/B Power Reset buttons.
3. Verify that seal relays and CRM relays are energized.
4. Concurrently, press and hold both Inch buttons.
5. Observe that the press cycles and stops on top.
6. Release the Inch buttons and press again for 1-2 seconds.
7. Observe that the press cycles until you release a button, then stops.

Test the Switches

Test the following switches with an operating clutch/brake control:

- C/B air pressure
- motion detector
- main motor forward

C/B Air Pressure Switch

1. Remove the C/B air pressure switch input from chassis A at slot 1 - terminal 11.
2. Place the mode selector switch in single-stroke mode.
3. Attempt to start the press and observe that it does not start.
4. Reconnect the air pressure switch input to chassis A (step 1).
5. Remove the switch input from chassis B (slot 1 - terminal 11) to repeat the test.
6. Attempt to start the press and observe that it does not start.
7. Reconnect the air pressure switch input to chassis B (step 5).

Motion Detector Switch

1. Remove the motion detector switch input from chassis A at slot 1 - terminal 8.
2. Place the mode selector switch in Single-stroke mode.
3. Start the press and observe that it stops before reaching bottom. If the press reaches bottom, the circuit is not functioning correctly.
4. Reconnect the motion detector switch input to chassis A (step 1).
5. Remove the switch input from chassis B (slot 1 - terminal 8) to repeat the test.
6. Start the press and observe that it stops before reaching bottom.
7. Reconnect the switch input to chassis B (step 5).

Main Motor Forward Switch

1. Remove the main motor forward switch input from chassis A at slot 1 - terminal 9.
2. Place the mode selector switch in Single-stroke mode.
3. Attempt to start the press and observe that it does not start.
4. Reconnect the main motor forward switch input.
5. Remove the switch input from chassis B (slot 1 - terminal 9) to repeat the test.
6. Repeat steps 3 and 4.

Notes:

Description of Operating Modes

Clutch/Brake Operating Modes

You can select any one of the following operating modes with the mode selector switch:

- Off
- Inch
- Single stroke
- Continuous stroking
- Micro Inch

Off

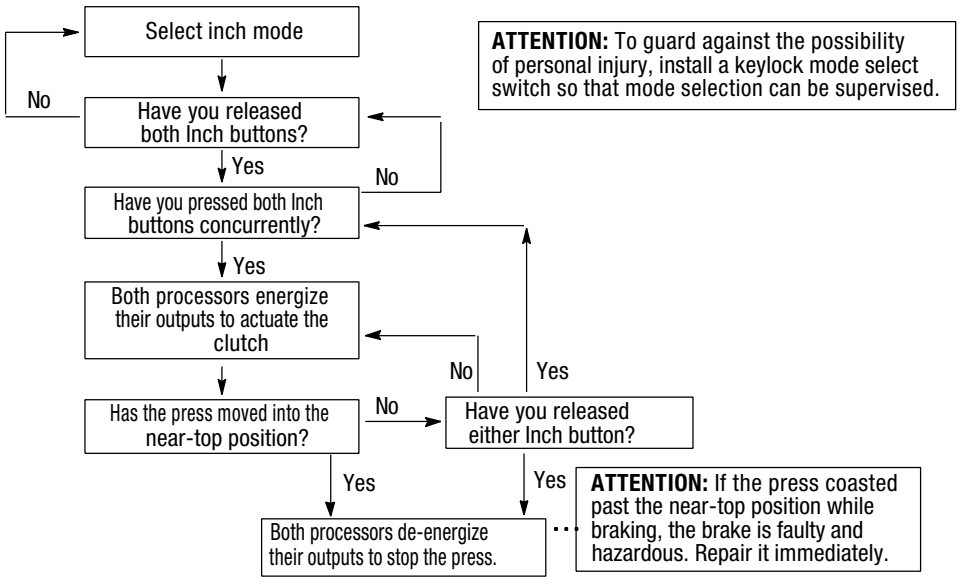
When an operator selects OFF, the control system is designed to:

- turn off all outputs to press valves.
- reset faults

Inch Mode

Before entering single or continuous mode, use inch mode to jog the press to the near-top position to set up the machine. The press stops when it moves into the near-top position or when you release a Inch button (Figure A.1).

Figure 0.1
Typical Operational Sequence for Inch Mode



Single Stroke Mode

Single stroke mode is designed to stroke the press once, from top to bottom to top, with the concurrent use of the Run buttons. Once the press reaches the takeover cam (TCAM), the operator can release the Run buttons without stopping the press. It continues to the near-top position.

In downstroke, releasing a Run button stops the press (Figure A.2). Then, if the press did not enter the upstroke zone (TCAM On), you may resume downstroke by again pressing Run buttons.

Once the press reaches the takeover cam (TCAM), the press continues automatically through the upstroke (Figure A.3).

Figure 0.2
Typical Operational Sequence for Downstroke in Single Mode

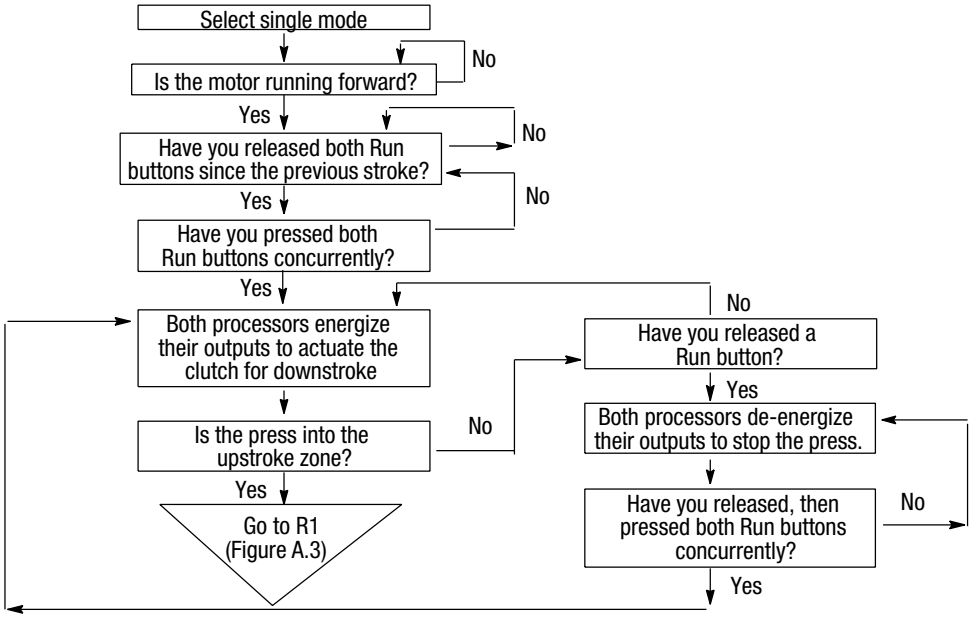
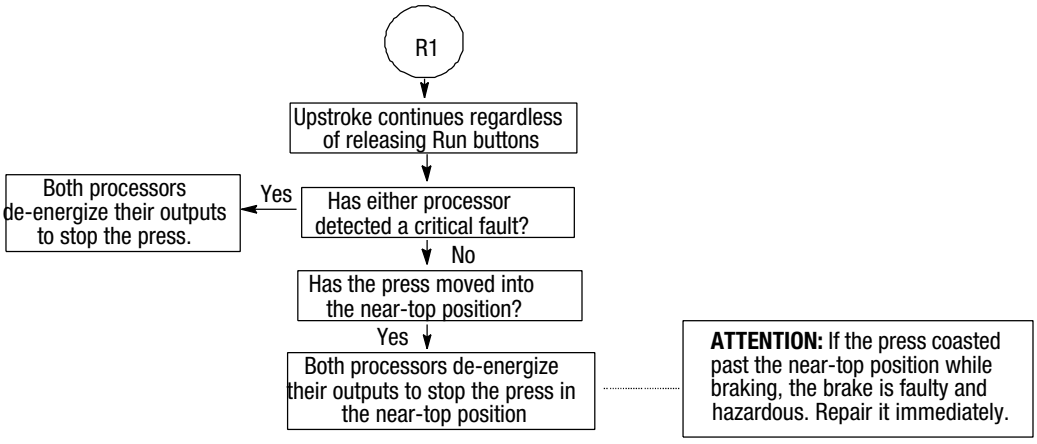


Figure 0.3
Typical Operational Sequence for Upstroke in Single Mode



Continuous Mode with Arm Continuous

To run your press continuously, ready the press as follows:

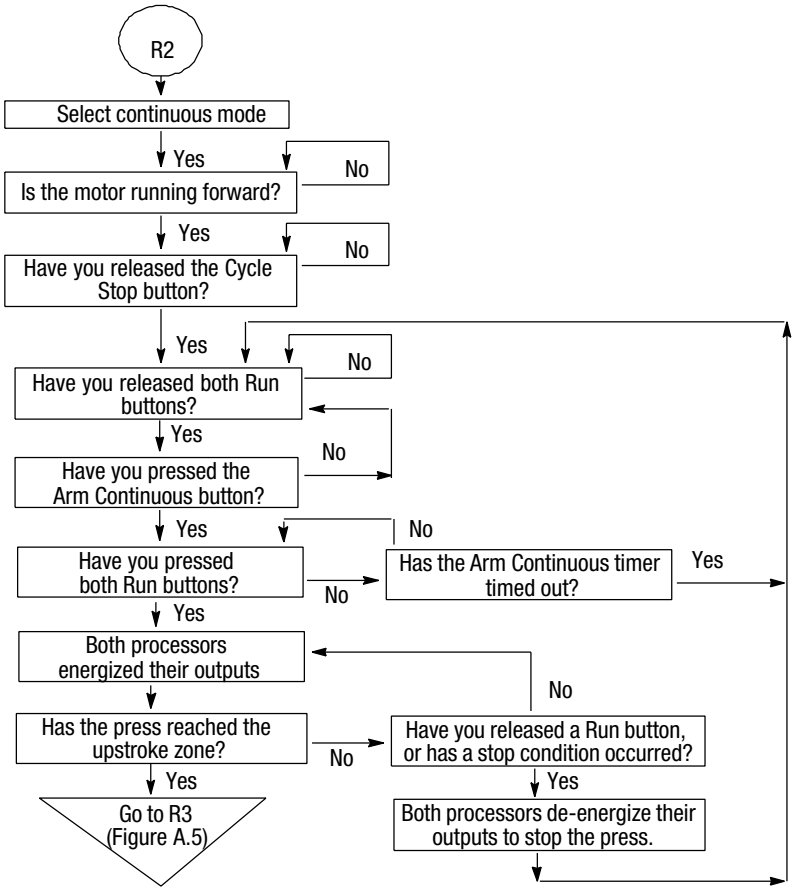
- select continuous mode
- press the arm continuous button
- press both Run buttons within 5 seconds

During the first downstroke (Figure A.4), releasing a Run button stops the press. Then, if the press did not enter the upstroke zone (TCAM still off), you may resume downstroke within 5 seconds if you release and press both Run buttons again. If 5 seconds passes and the press stops, you must press the Arm Continuous button and Run buttons again to restart.

During the first upstroke (Figure A.4) when TCAMs come on, you may release Run buttons and the press will continue stroking. If you start the press in upstroke, you must press the Arm Continuous button and then hold Run buttons for a complete cycle until next upstroke.

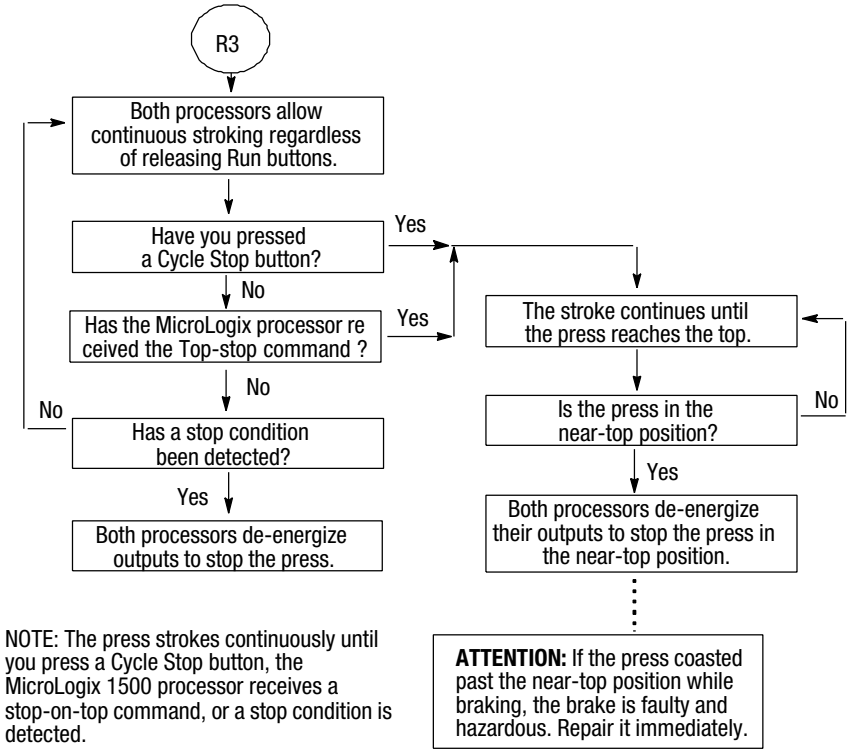
Once in continuous stroking operation (Figure A.5), the press stops at the next near-top position whenever it receives a stop-on-top command. However, the press stops immediately whenever either processor detects a trip or stop condition or a required condition is removed.

Figure 0.4
Typical Operational Sequence to Start Continuous Mode



NOTE: Releasing a Run button during first downstroke stops the press. If the slide has not entered the upstroke zone, you can resume downstroke within 5 seconds of pressing the Arm Continuous button. After 5 seconds (and the press is stopped), you must restart continuous mode with the arming sequence.

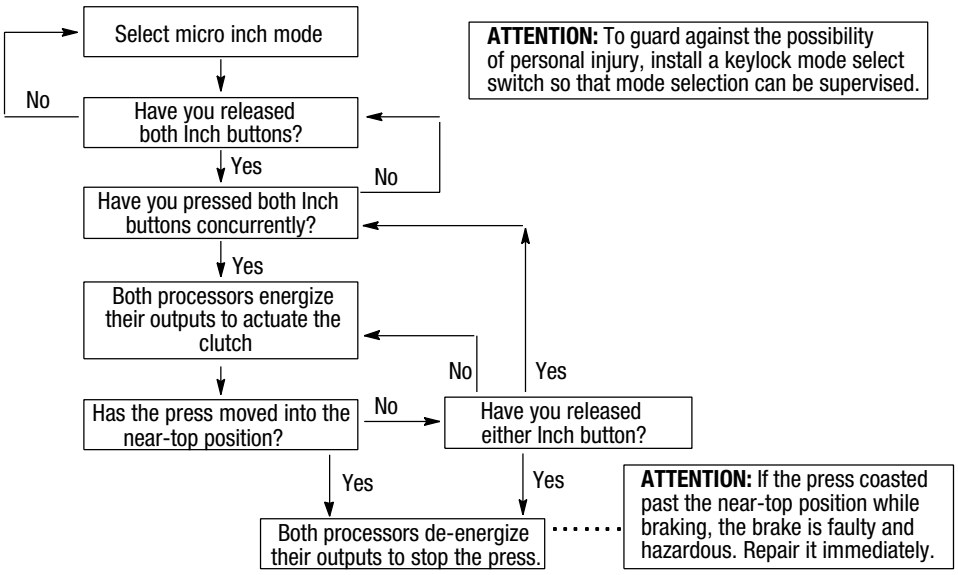
Figure 0.5
Typical Operational Sequence for Continuous Stroking



Micro Inch Mode

Before entering single or continuous mode, use micro inch mode to jog the press to the near-top position to set up the machine. The press stops when it moves into the near-top position or when you release a Inch button (Figure A.6).

Figure 0.6
Typical Operational Sequence for Inch Mode



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Notes:

Processor Faults and Operator Prompts

Fault Codes for Troubleshooting

Whenever a MicroLogix processor detects a fault, it sets a corresponding Fault # or PanelView message. We list the conditions for which the software is designed to detect and signal faults. Fault #s (read from the data table) are independent of interface module used.

For message #s, use the following table to look up the Fault # and respond to the fault.

Processor Faults (Ex: B168/0 = Fault 001)

Micrologix Clutch/Brake Faults

FAULT #	Fault Description	Cause of Fault	Effect of Fault	How to Correct the Fault
1	PLC HeartBeat Failed	Processor failure.	C/B power is de-energized.	Troubleshoot processor to determine cause of failure.
2	Perimeter Guard Check Failed	Perimeter Guard Wiring Problem.	Press will not stroke.	Check Perimeter Guard wiring.
3	Clutch/Brake Power Feedback Fault	Power still "ON" when Seal Relay "OFF"	Press will not stroke.	Check Seal relay and wiring. Check operation of input module in slot 2.
4	Procesoer OK Relay Check	Controller OK relay failed to close.	C/B power will not turn ON.	Check Controller OK relay and wiring. Check operation of input module in slot 2.
5	Seal Relay Failed to Turn On	Seal relay A failed to close.	C/B power will not turn ON.	Check seal relay and wiring. Check operation of input module in slot 1.
6	Seal Relay Failed to Turn Off	Seal relay A welded closed.	C/B power is de-energized and will not turn ON.	Check seal relay and wiring. Check operation of input module in slot 1.
7-8	Spare			
9	No Valid Clutch/Brake Mode	Mode-select failed.	C/B power will not turn ON.	Check mode selector switch and wiring. Check operation of input module in slot 1.
10	C/B Mode Mismatch Between Processors	Each processor sees a different mode.	Press will not stroke.	Check mode selector switch and wiring. Check operation of input module in slot 1.
11-14	Spare			
15	Run Station Tiedown	Time between pressing Run buttons was too long.	Press will not start a stroke in single or continuous mode.	Release, then press run buttons simultaneously. Check button wiring.
16-24	Spare			
25	Inch Button Tiedown	Time between pressing Inch buttons was too long.	Press will not inch.	Release, then press inch buttons simultaneously. Check button wiring.
26-27	Spare			
28	Slide Transitioned from Top Zone To Upstroke	Cam Input combinations did not go from top to downstroke.	Press will stop or not run in single or continuous mode.	Check cam inputs for proper operation or settings.

FAULT #	Fault Description	Cause of Fault	Effect of Fault	How to Correct the Fault
29	Slide Transitioned from Downstroke Zone To Top	Cam Input combinations did not go from downstroke to upstroke.	Press will stop or not run in single or continuous mode.	Check cam inputs for proper operation or settings.
30	Slide Transitioned from Upstroke Zone To Downstroke	Cam Input combinations did not go from upstroke to top.	Press will stop or not run in single or continuous mode.	Check cam inputs for proper operation or settings.
31	Illegal Cam Combination Fault (All Cams Off)	Cam Input combination not allowed.	Press will stop or not run in single or continuous mode.	Check cam inputs for proper operation or settings.
32	Illegal Cam Combination Fault (ACAM Off & BCAM On)	Cam Input combination not allowed.	Press will stop or not run in single or continuous mode.	Check cam inputs for proper operation or settings.
33-34	Spare			
35	ACAM Did Not Cycle Off During Upstroke	ACAM did not cycle during upstroke.	Press will stop or not run in single or continuous mode.	Check cam inputs for proper operation or settings.
36-39	Spare			
40	C/B Air Pressure	Software detected no air pressure after energizing main valves.	Clutch valves are de-energized.	Check I/O wiring. Check air pressure switch.
41	Spare			
42	Brake Monitor Cam Mismatch Between Processors	One processor sees the BCAM while the other does not.	Press will stop or not run in single or continuous mode.	Check cam inputs for proper operation or settings.
43	Takeover Cam Mismatch Between Processors	One processor sees the TCAM while the other does not.	Press will stop or not run in single or continuous mode.	Check cam inputs for proper operation or settings.
44	AntiRepeat Cam Mismatch Between Processors	One processor sees the ACAM while the other does not.	Press will stop or not run in single or continuous mode.	Check cam inputs for proper operation or settings.
45-46	Spare			
47	Brake Monitor	On a stop-on-top command, the press slides onto the BCAM before stopping.	Press cannot operate in single or continuous mode.	Check the brake and brake monitor cam settings.
48	Perimeter Guard/Safety Device Fault	Perimeter Guard Input De-Energized while press in motion.	C/B power is de-energized.	Check Perimeter Guard Input.
49	No Motion Detected	Upon command to move, no motion was detected.	The press will stop.	Check motion detector switch and wiring.
50	Spare			
51	Motion Detected With C/B Valves Off	Motion was detected when no motion was commanded.	C/B outputs are de-energized.	Check motion detector switch and wiring.
52	At Rest Inch Button Tiedown	On switching to inch, the software detected a held inch button.	The press will not inch.	Check prompts for reasons why press will not inch. Check inch button wiring.
53	Spare			

FAULT #	Fault Description	Cause of Fault	Effect of Fault	How to Correct the Fault
54	At Rest Run Button Tiedown	On switching to run, the software detected a held run button.	The press will not run in single or continuous mode.	Check prompts for reasons why press will not run. Check run button wiring.
55	Inch Mode Permit Start Lost	User Permit Start not "ON"	Press will not inch.	Turn "ON" User Permit Start.
56	Inch Mode Permit Inch Lost	User Permit Inch not "ON"	Press will not inch.	Turn "ON" User Permit Inch.
57-66	Spare			
67	Clutch/Brake Dual Valve 1 Failed To Turn On	Valve failed to energize when output was turned ON.	Press will not cycle.	Check valve and valve wiring.
68	Clutch/Brake Dual Valve 1 Failed To Turn Off	Valve failed to energize when output was turned OFF.	C/B power is removed.	Check valve and valve wiring.
69	Clutch/Brake Dual Valve 2 Failed To Turn On	Valve failed to energize when output was turned ON.	Press will not cycle.	Check valve and valve wiring.
70	Clutch/Brake Dual Valve 2 Failed To Turn Off	Valve failed to energize when output was turned OFF.	C/B power is removed.	Check valve and valve wiring.
71-76	Spare			
77	Micro Inch Valve 1 Failed To Turn On	Valve failed to energize when output was turned ON.	Press will not cycle.	Check valve and valve wiring.
78	Micro Inch Valve 1 Failed To Turn Off	Valve failed to energize when output was turned OFF.	C/B power is removed.	Check valve and valve wiring.
79	Micro Inch Valve 2 Failed To Turn On	Valve failed to energize when output was turned ON.	Press will not cycle.	Check valve and valve wiring.
80	Micro Inch Valve 2 Failed To Turn Off	Valve failed to energize when output was turned OFF.	C/B power is removed.	Check valve and valve wiring.

Prompts for Operating the Press

Whenever the processor detects conditions worthy of a prompt, it sets corresponding Prompt #s or equivalent PanelView prompts.
We list conditions for which the software is designed to detect and signal a prompt. Prompts #s (read from the data table) are independent of interface module used.

Operator Prompts (Ex: B169/0 = Prompt 001)

Micrologix Clutch/Brake Prompts

FAULT #	Prompt Description	Cause of Prompt	Effect of Prompt	How to Correct the Condition
1	Cross Wiring Test in Progress	Cross Wiring Test.	No C/B power until test complete.	None
2	E-Stop Actuated	E-Stop button was pressed, or E-Stop circuit failed.	CRM and Seal Relays opened.	Release E-Stop button. Press control reset and C/B reset buttons.
3-5	Spare			
6	Perimeter Guard Input not Energized (only when press not in motion)	Perimeter Guard Input De-Energized.	Press will not cycle.	Check Perimeter Guard Input.
7-13	Spare			
14	Main Motor is not running forward.	Main Motor not running forward in single or continuous mode.	Valve outputs turn OFF.	Start the main motor (forward).
15	C/B power is not reset.	Seal Relay is not closed.	Valve outputs remain OFF.	Clear faults. Reset control power.
16	Spare			
17	Run Buttons Not Released.	One or both of the Run Buttons pressed.	Press will not cycle.	Release the Run Buttons.
18	Inch Buttons Not Released.	One or both of the Inch Buttons pressed.	Press will not inch.	Release the Inch Buttons.
19-20	Spare			
21	Stop-on-top button pressed.	The stop-on-top button is pressed.	The press will complete the cycle and stop on top.	None
22	Continuous mode not armed.	You did not press the arm continuous button.	You can't start the press in continuous.	Press the arm continuous button.
23	Top Stop Reached, Release Buttons.	Press at top and Run or Inch buttons pressed.	Press will not cycle.	Release Run or Inch Buttons.
24-30	Spare			
31	User Immediate Stop	User Permit Run De-Energized.	Press will not cycle.	Check User Permit Run Input.
32	User Cycle Stop	User Permit Start was De-Energized during continuous mode.	Press will Top-Stop.	Check User Permit Start.
33-79	Spare			
80	Clutch/Brake Fault Present.	C/B Fault present.	Press will not Cycle.	Clear C/B Fault.

Wiring Drawings

How We Present Wiring Drawings

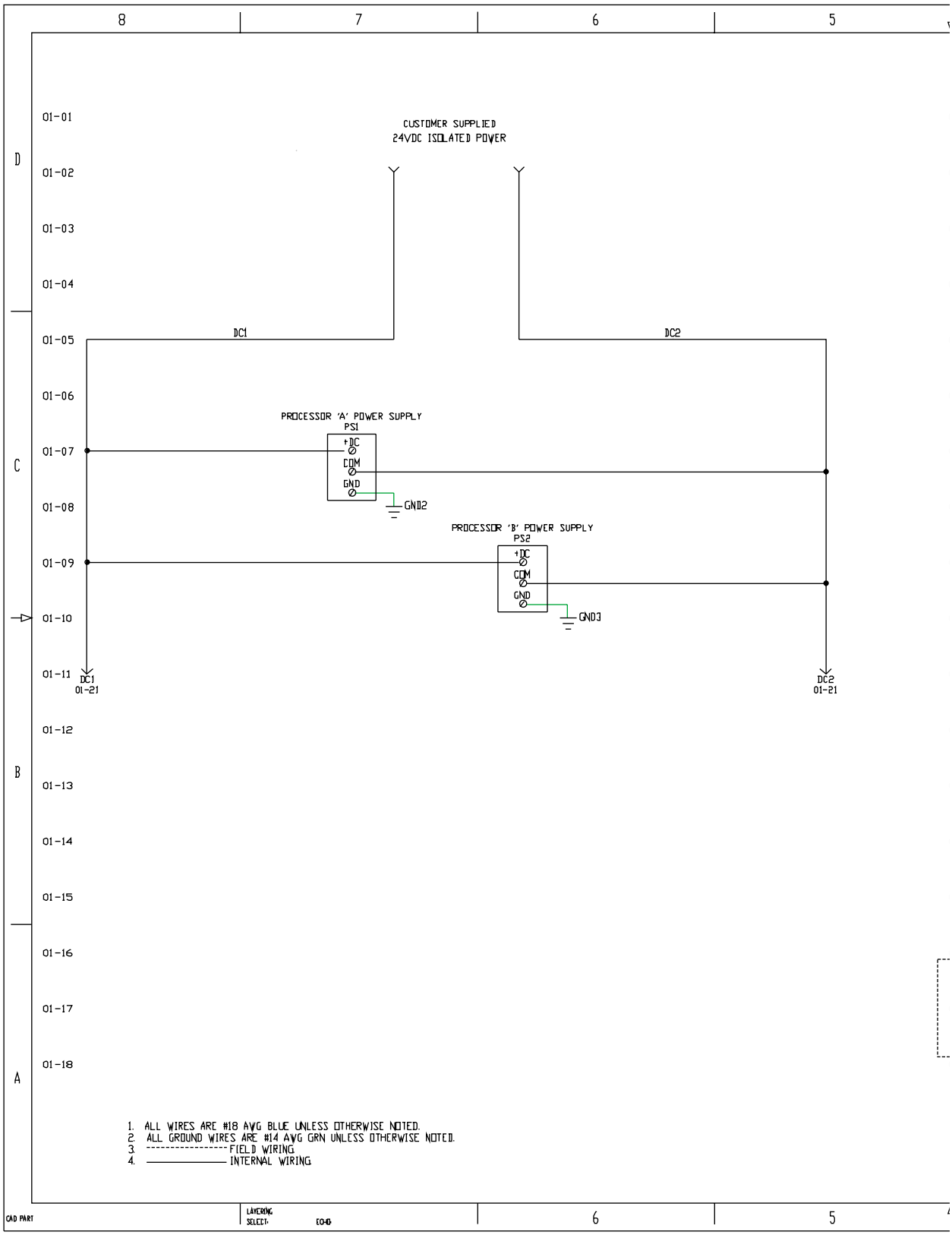
We show the following dc wiring drawings for your clutch/brake control.

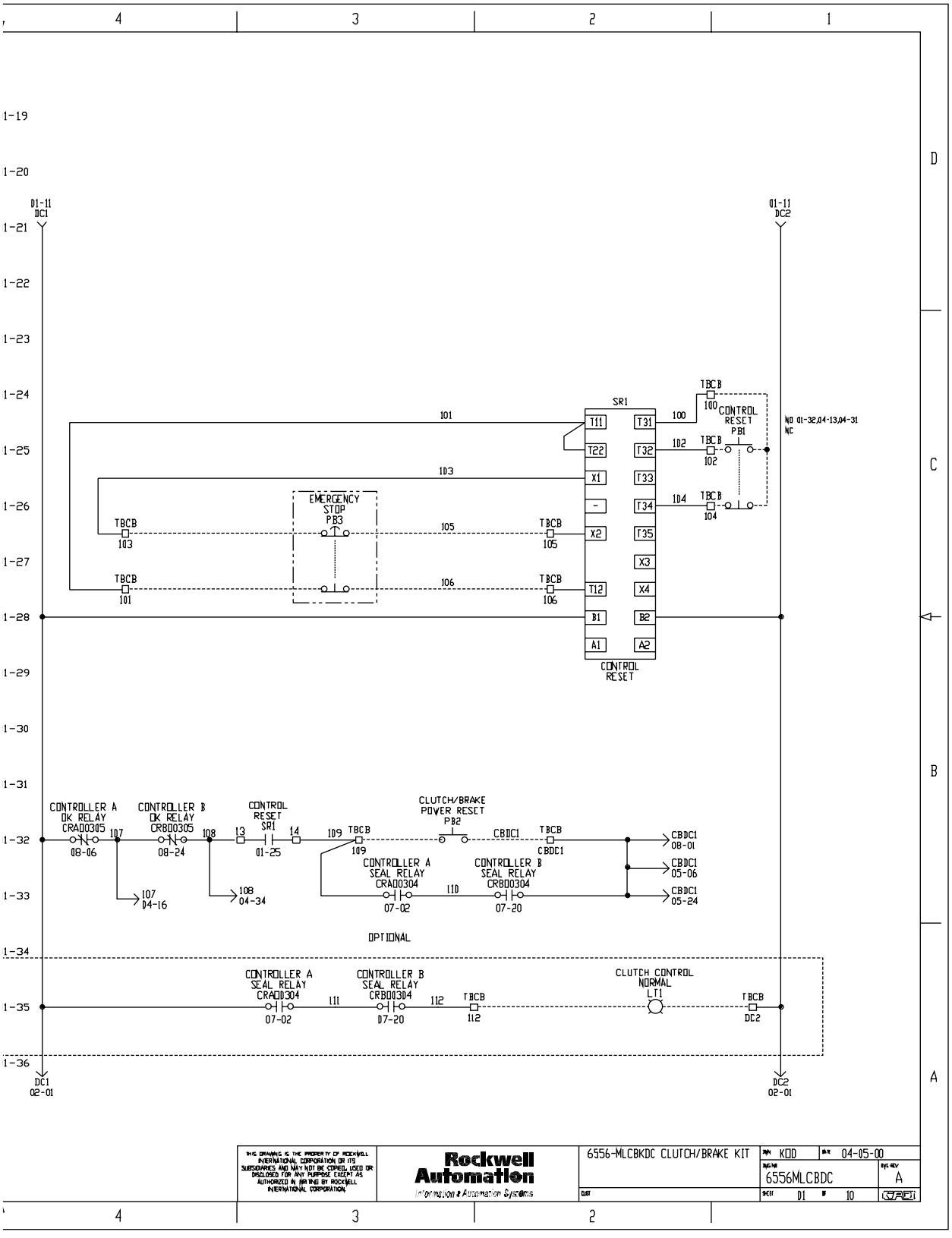
Inputs and outputs by I/O module and slot location are as follows:

For	In I/O Module Location	See Drawing Sheet
Power Distribution	Base unit	1 of 8
Inputs to 1764-28BXB base unit of Controller cross-checked inputs (same as cross-checked outputs, next)	Base unit	2 of 8
• Outputs to 1764-28BXB base unit Cross-checked Outputs • OK To Energize Seal • BCD Mode • ACAM,BCAM,TCAM • Clutch Output ON • Heartbeat	Base Unit	3 of 8
Inputs to 1769-IQ16 (dc) or 1769-IA16 (ac) • Mode Select • Emergency Stop Master Relay • Controller OK relays • Seal Relay • Clutch/Brake 1 Feedback • Clutch/Brake 2 Feedback • Controller B MicroInch 1 and 2 Output Feedbacks • ACAM,BCAM,TCAM	Slot 1	4 of 8
Inputs to 1769-IQ16 (dc) or 1769-IA16 (ac) • Clutch/Brake Power Feedback • Clutch/Brake Air Pressure • Perimeter Guard A • Motion Detect • Main Motor Forward • Cycle Stop • Arm Continuous setup • Fault Reset • User Permits • Left and Right Run Stations • Left and Right Inch Pushbuttons	Slot 2	5 of 8
1769-OW8I (dc or ac) Outputs • Perimeter Guard A Input • Controller Seal Relay • Controller OK Relay • Continuous Armed • Clutch Control Fault	Slot 3	6 of 8

For	In I/O Module Location	See Drawing Sheet
1769-OW8I (dc or ac) Outputs • Controller A Clutch/Brake 1 and 2 Output Feedbacks • Controller B Clutch/Brake 1 and 2 Output Feedbacks • Controller A MicroInch 1 and 2 Output Feedbacks • Controller B MicroInch 1 and 2 Output Feedbacks	Slot 4	7 of 8

Wire power supplies according to instructions that accompanied them.


8
7
6
5
D
C
B
A
01-01
01-02
01-03
01-04
01-05
01-06
01-07
01-08
01-09
01-10
01-11
01-12
01-13
01-14
01-15
01-16
01-17
01-18
CUSTOMER SUPPLIED
24VDC ISOLATED POWER
DC1
DC2
PROCESSOR 'A' POWER SUPPLY
PS1
+DC
COM
GND
GND2
PROCESSOR 'B' POWER SUPPLY
PS2
+DC
COM
GND
GND3
DC1
01-21
DC2
01-21
1. ALL WIRES ARE #18 AWG BLUE UNLESS OTHERWISE NOTED.
2. ALL GROUND WIRES ARE #14 AWG GRN UNLESS OTHERWISE NOTED.
3. ---------- FIELD WIRING.
4. ———— INTERNAL WIRING.
CAD PART
LAYERING SELECT:
EC43
6
5


4
3
2
1
D
C
B
A
01-11
DC1
01-11
DC2
SR1
T11
T22
X1
-
X2
B1
A1
T31
T32
T33
T34
T35
X3
X4
T12
B2
A2
CONTROL
RESET
TBCB
100
CONTROL
RESET
PB1
NO 01-32,04-13,04-31
NC
101
102
103
104
105
106
EMERGENCY
STOP
PB3
CONTROLLER A
OK RELAY
CRA00305
08-06
CONTROLLER B
OK RELAY
CRB00305
08-24
CONTROL
RESET
SR1
01-25
CLUTCH/BRAKE
POWER RESET
PB2
CBDC1
107
108
109
110
111
112
04-16
04-34
CONTROLLER A
SEAL RELAY
CRA00304
07-02
CONTROLLER B
SEAL RELAY
CRB00304
07-20
CBDC1
08-01
CBDC1
05-06
CBDC1
05-24
OPTIONAL
CLUTCH CONTROL
NORMAL
LT1
DC2
02-01
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Rockwell Automation
Information & Automation Systems
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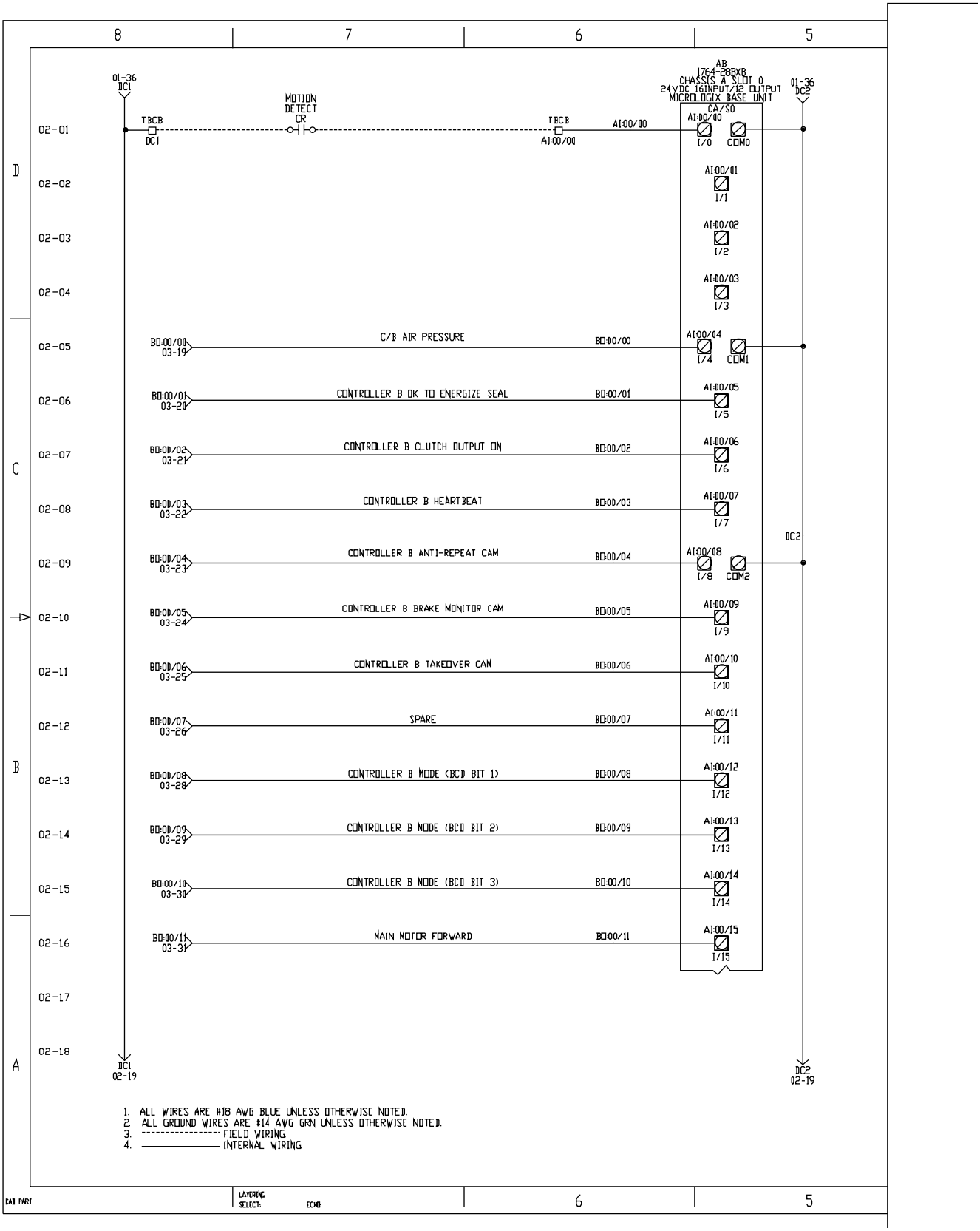
A
D1
10


8
7
6
5
01-36
DC1
MOTION
DETECT
CR
TBCB
DC1
TBCB
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AB
1764-28BXB
CHASSIS A SLOT 0
24VDC 16INPUT/12 OUTPUT
MICROLOGIX BASE UNIT
CA/S0
01-36
DC2
AI:00/00
I/0
COM0
AI:00/01
I/1
AI:00/02
I/2
AI:00/03
I/3
AI:00/04
I/4
COM1
AI:00/05
I/5
AI:00/06
I/6
AI:00/07
I/7
AI:00/08
I/8
COM2
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AI:00/14
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AI:00/15
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DC2
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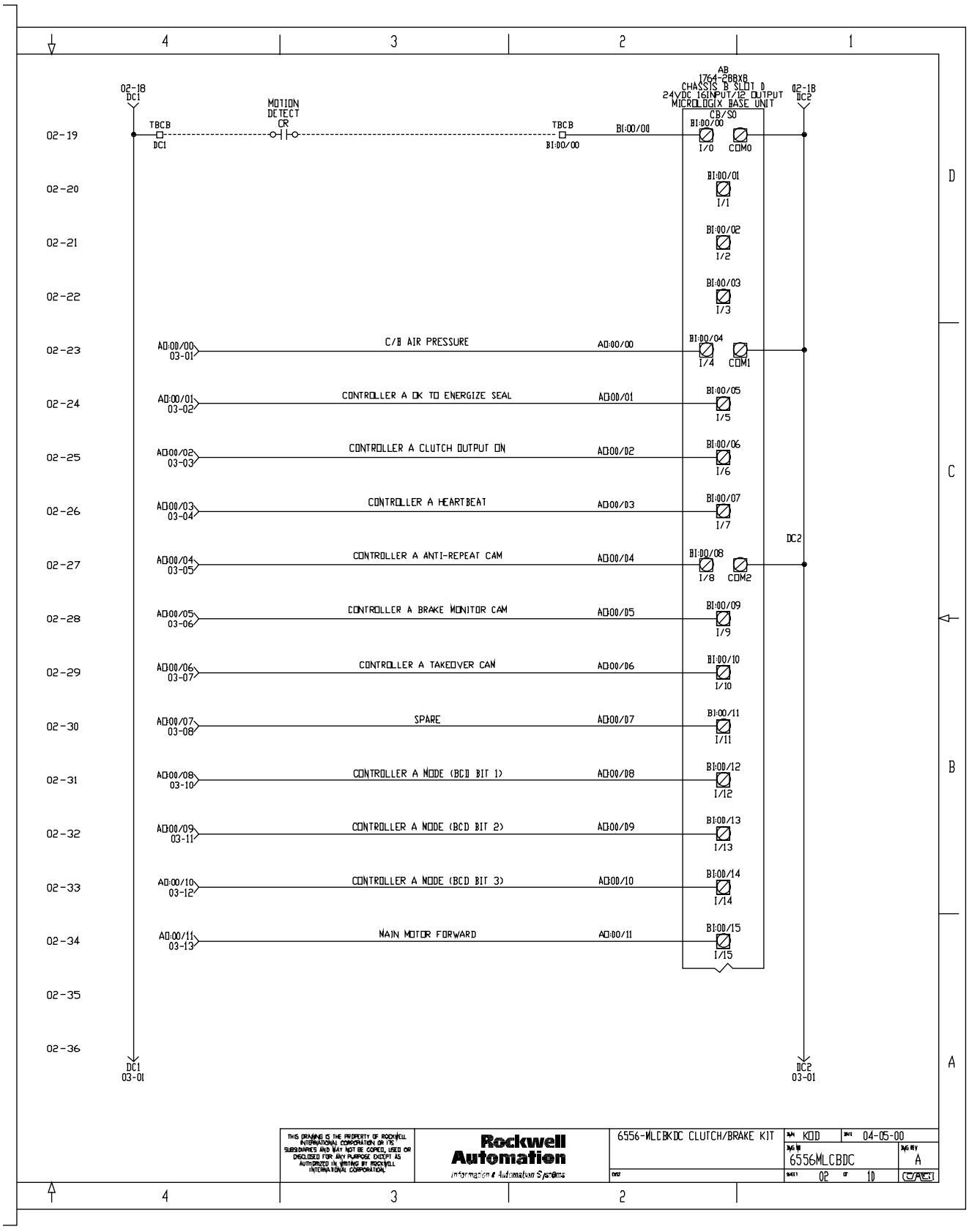
03-19
C/B AIR PRESSURE
B0:00/00
B0:00/01
03-20
CONTROLLER B OK TO ENERGIZE SEAL
B0:00/01
B0:00/02
03-21
CONTROLLER B CLUTCH OUTPUT ON
B0:00/02
B0:00/03
03-22
CONTROLLER B HEARTBEAT
B0:00/03
B0:00/04
03-23
CONTROLLER B ANTI-REPEAT CAM
B0:00/04
B0:00/05
03-24
CONTROLLER B BRAKE MONITOR CAM
B0:00/05
B0:00/06
03-25
CONTROLLER B TAKEOVER CAM
B0:00/06
B0:00/07
03-26
SPARE
B0:00/07
B0:00/08
03-28
CONTROLLER B MODE (BCD BIT 1)
B0:00/08
B0:00/09
03-29
CONTROLLER B MODE (BCD BIT 2)
B0:00/09
B0:00/10
03-30
CONTROLLER B MODE (BCD BIT 3)
B0:00/10
B0:00/11
03-31
MAIN MOTOR FORWARD
B0:00/11
02-01
02-02
02-03
02-04
02-05
02-06
02-07
02-08
02-09
02-10
02-11
02-12
02-13
02-14
02-15
02-16
02-17
02-18
D
C
B
A
DC1
02-19
DC2
02-19
1. ALL WIRES ARE #18 AWG BLUE UNLESS OTHERWISE NOTED.
2. ALL GROUND WIRES ARE #14 AWG GRN UNLESS OTHERWISE NOTED.
3. ---------- FIELD WIRING.
4. ———— INTERNAL WIRING.
CAD PART
LAYERING
SELECT:
ECAD:
6
5


4
3
2
1
AB
1764-28BXB
CHASSIS B SLOT 0
24VDC 16INPUT/12 OUTPUT
MICROLOGIX BASE UNIT
02-18
DC1
MOTION
DETECT
CR
02-1B
DC2
TBCB
DC1
TBCB
B1:00/00
CB/S0
B1:00/00
I/0
COM0
02-19
B1:00/01
I/1
02-20
B1:00/02
I/2
02-21
B1:00/03
I/3
02-22
A0:00/00
03-01
C/B AIR PRESSURE
A0:00/00
B1:00/04
I/4
COM1
02-23
A0:00/01
03-02
CONTROLLER A OK TO ENERGIZE SEAL
A0:00/01
B1:00/05
I/5
02-24
A0:00/02
03-03
CONTROLLER A CLUTCH OUTPUT ON
A0:00/02
B1:00/06
I/6
02-25
A0:00/03
03-04
CONTROLLER A HEARTBEAT
A0:00/03
B1:00/07
I/7
02-26
DC2
A0:00/04
03-05
CONTROLLER A ANTI-REPEAT CAM
A0:00/04
B1:00/08
I/8
COM2
02-27
A0:00/05
03-06
CONTROLLER A BRAKE MONITOR CAM
A0:00/05
B1:00/09
I/9
02-28
A0:00/06
03-07
CONTROLLER A TAKEOVER CAM
A0:00/06
B1:00/10
I/10
02-29
A0:00/07
03-08
SPARE
A0:00/07
B1:00/11
I/11
02-30
A0:00/08
03-10
CONTROLLER A MODE (BCD BIT 1)
A0:00/08
B1:00/12
I/12
02-31
A0:00/09
03-11
CONTROLLER A MODE (BCD BIT 2)
A0:00/09
B1:00/13
I/13
02-32
A0:00/10
03-12
CONTROLLER A MODE (BCD BIT 3)
A0:00/10
B1:00/14
I/14
02-33
A0:00/11
03-13
MAIN MOTOR FORWARD
A0:00/11
B1:00/15
I/15
02-34
02-35
02-36
DC1
03-01
DC2
03-01
D
C
B
A
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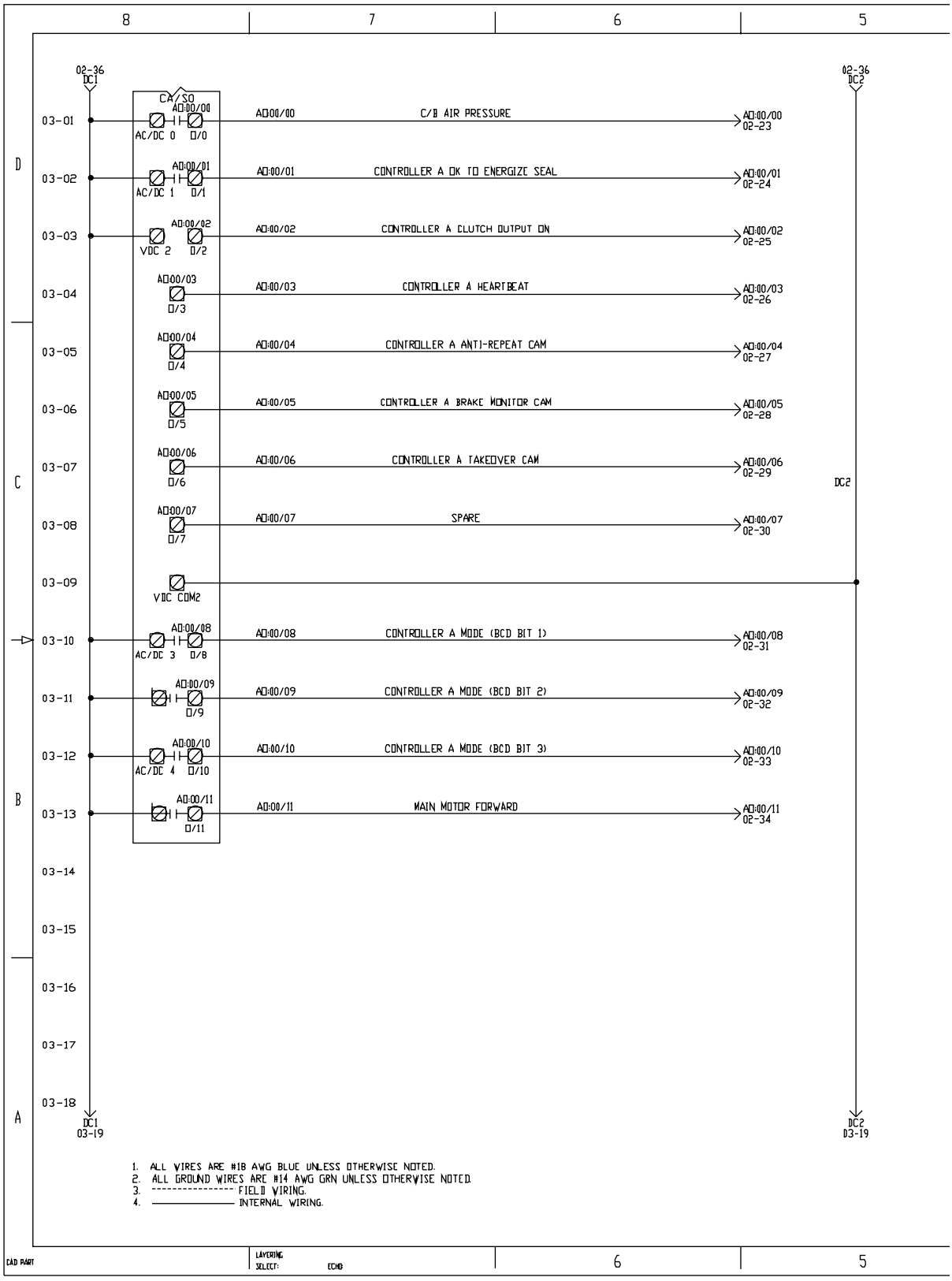
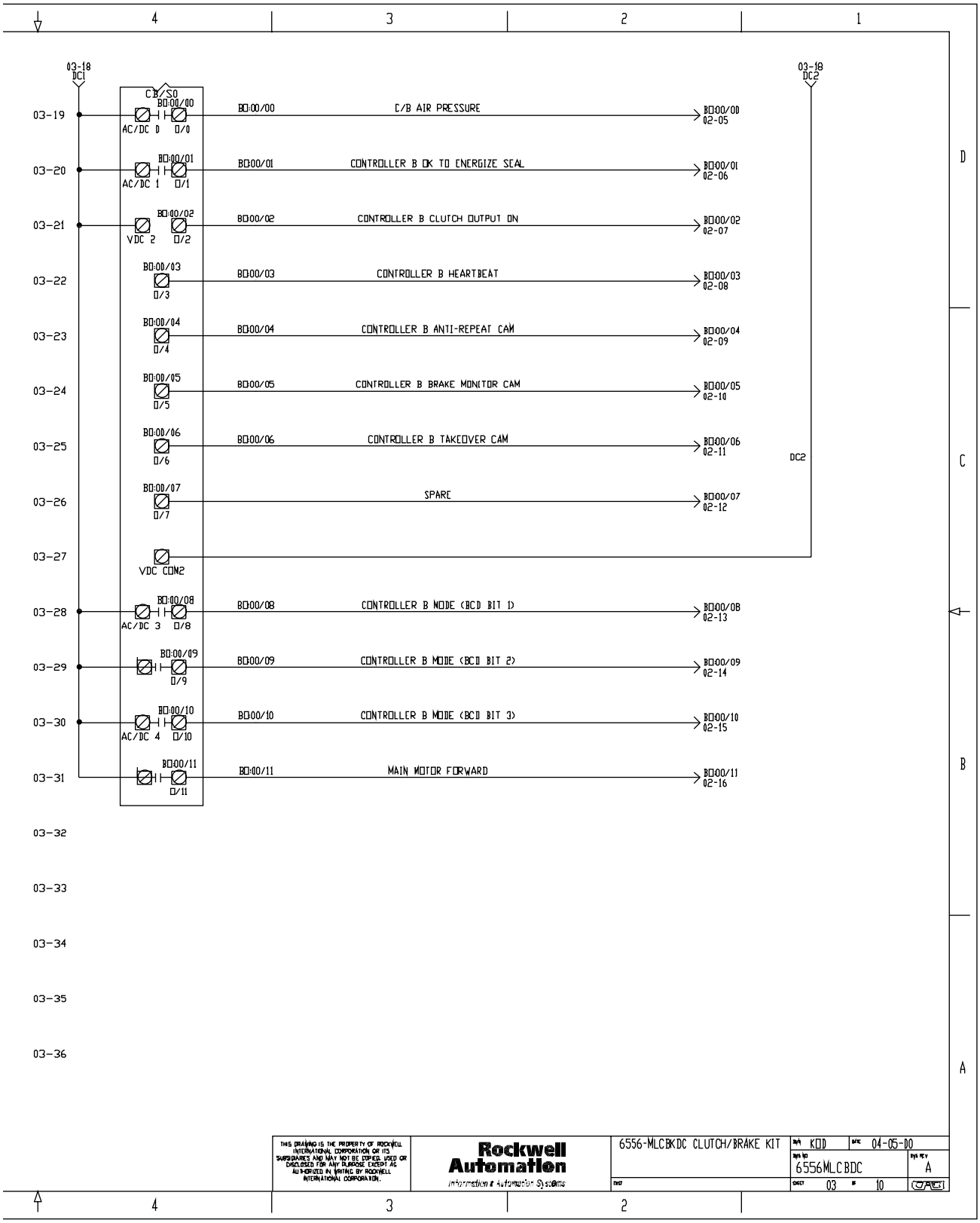
Rockwell Automation
Information & Automation Systems
6556-MLCBKDC CLUTCH/BRAKE KIT
DWN KDD
DATE 04-05-00
DWG NO 6556MLCBDC
DWG REV A
SHEET 02 OF 10
4
3
2


8
7
6
5
02-36 DC1
02-36 DC2
CA/SO
AC/DC 0
AC/DC 1
VDC 2
AC/DC 3
AC/DC 4
VDC COM2
C/B AIR PRESSURE
CONTROLLER A OK TO ENERGIZE SEAL
CONTROLLER A CLUTCH OUTPUT ON
CONTROLLER A HEARTBEAT
CONTROLLER A ANTI-REPEAT CAM
CONTROLLER A BRAKE MONITOR CAM
CONTROLLER A TAKEOVER CAM
SPARE
CONTROLLER A MODE (BCD BIT 1)
CONTROLLER A MODE (BCD BIT 2)
CONTROLLER A MODE (BCD BIT 3)
MAIN MOTOR FORWARD
03-01
03-02
03-03
03-04
03-05
03-06
03-07
03-08
03-09
03-10
03-11
03-12
03-13
03-14
03-15
03-16
03-17
03-18
DC1 03-19
DC2 03-19
1. ALL WIRES ARE #18 AWG BLUE UNLESS OTHERWISE NOTED.
2. ALL GROUND WIRES ARE #14 AWG GRN UNLESS OTHERWISE NOTED.
3. ---------- FIELD WIRING.
4. ———————— INTERNAL WIRING.


4
3
2
1
03-18
DC1
03-18
DC2
C/B SO
B□:00/00
AC/DC 0 □/0
B□:00/00
C/B AIR PRESSURE
B□:00/00
02-05
B□:00/01
AC/DC 1 □/1
B□:00/01
CONTROLLER B OK TO ENERGIZE SEAL
B□:00/01
02-06
B□:00/02
VDC 2 □/2
B□:00/02
CONTROLLER B CLUTCH OUTPUT ON
B□:00/02
02-07
B□:00/03
□/3
B□:00/03
CONTROLLER B HEARTBEAT
B□:00/03
02-08
B□:00/04
□/4
B□:00/04
CONTROLLER B ANTI-REPEAT CAM
B□:00/04
02-09
B□:00/05
□/5
B□:00/05
CONTROLLER B BRAKE MONITOR CAM
B□:00/05
02-10
B□:00/06
□/6
B□:00/06
CONTROLLER B TAKEOVER CAM
B□:00/06
02-11
DC2
B□:00/07
□/7
SPARE
B□:00/07
02-12
VDC COM2
B□:00/08
AC/DC 3 □/8
B□:00/08
CONTROLLER B MODE (BCD BIT 1)
B□:00/08
02-13
B□:00/09
□/9
B□:00/09
CONTROLLER B MODE (BCD BIT 2)
B□:00/09
02-14
B□:00/10
AC/DC 4 □/10
B□:00/10
CONTROLLER B MODE (BCD BIT 3)
B□:00/10
02-15
B□:00/11
□/11
B□:00/11
MAIN MOTOR FORWARD
B□:00/11
02-16
03-19
03-20
03-21
03-22
03-23
03-24
03-25
03-26
03-27
03-28
03-29
03-30
03-31
03-32
03-33
03-34
03-35
03-36
D
C
B
A
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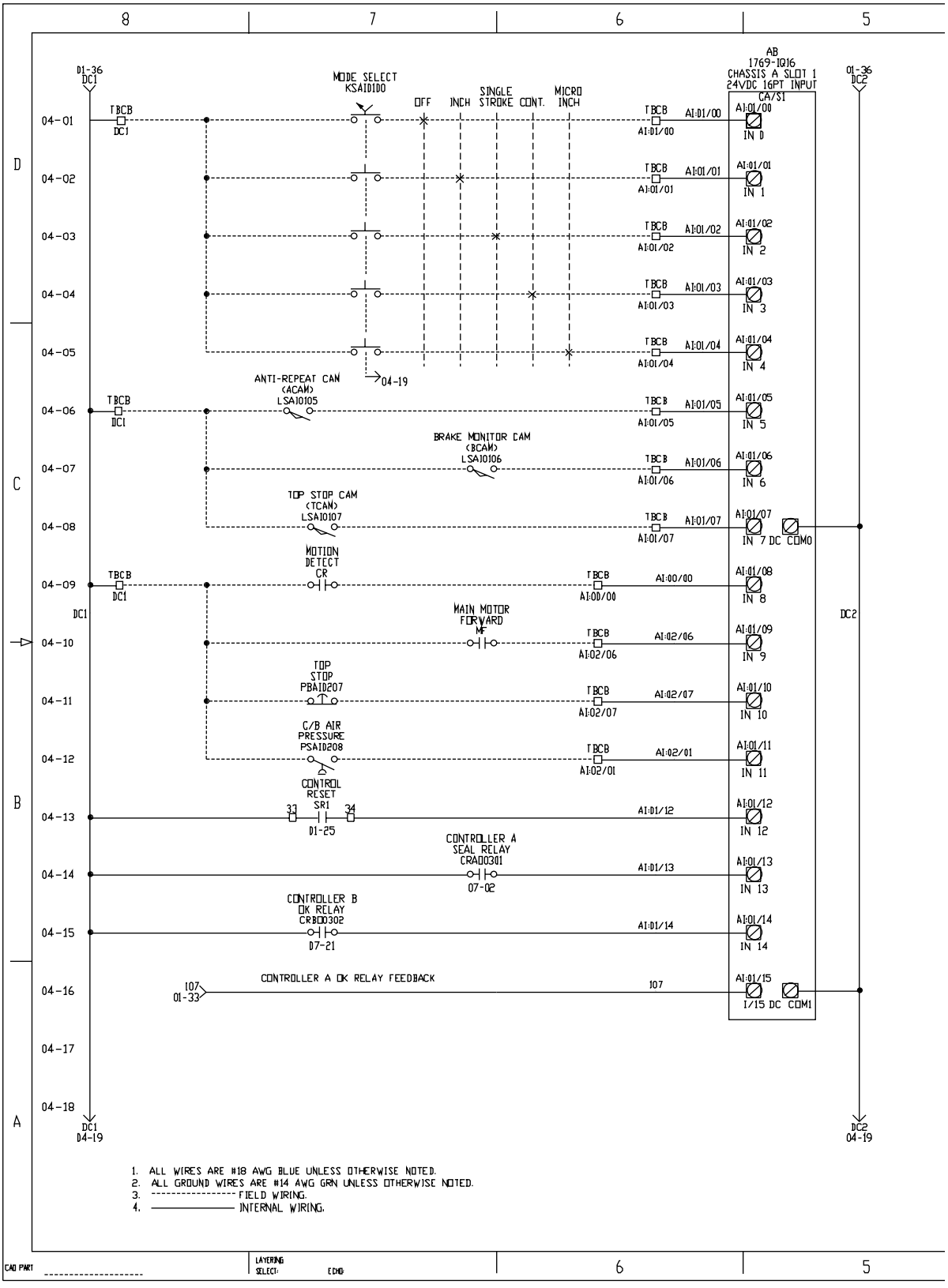
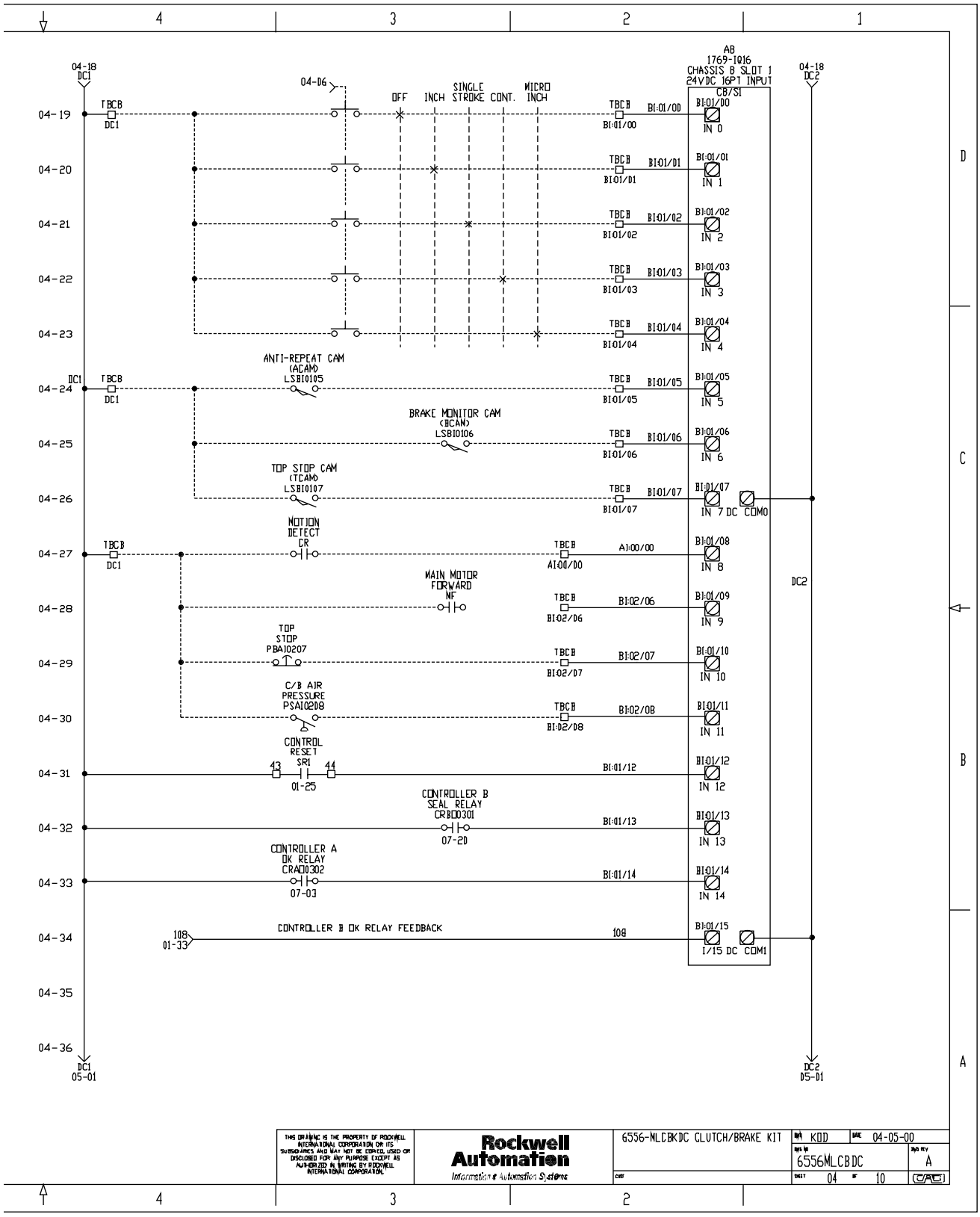
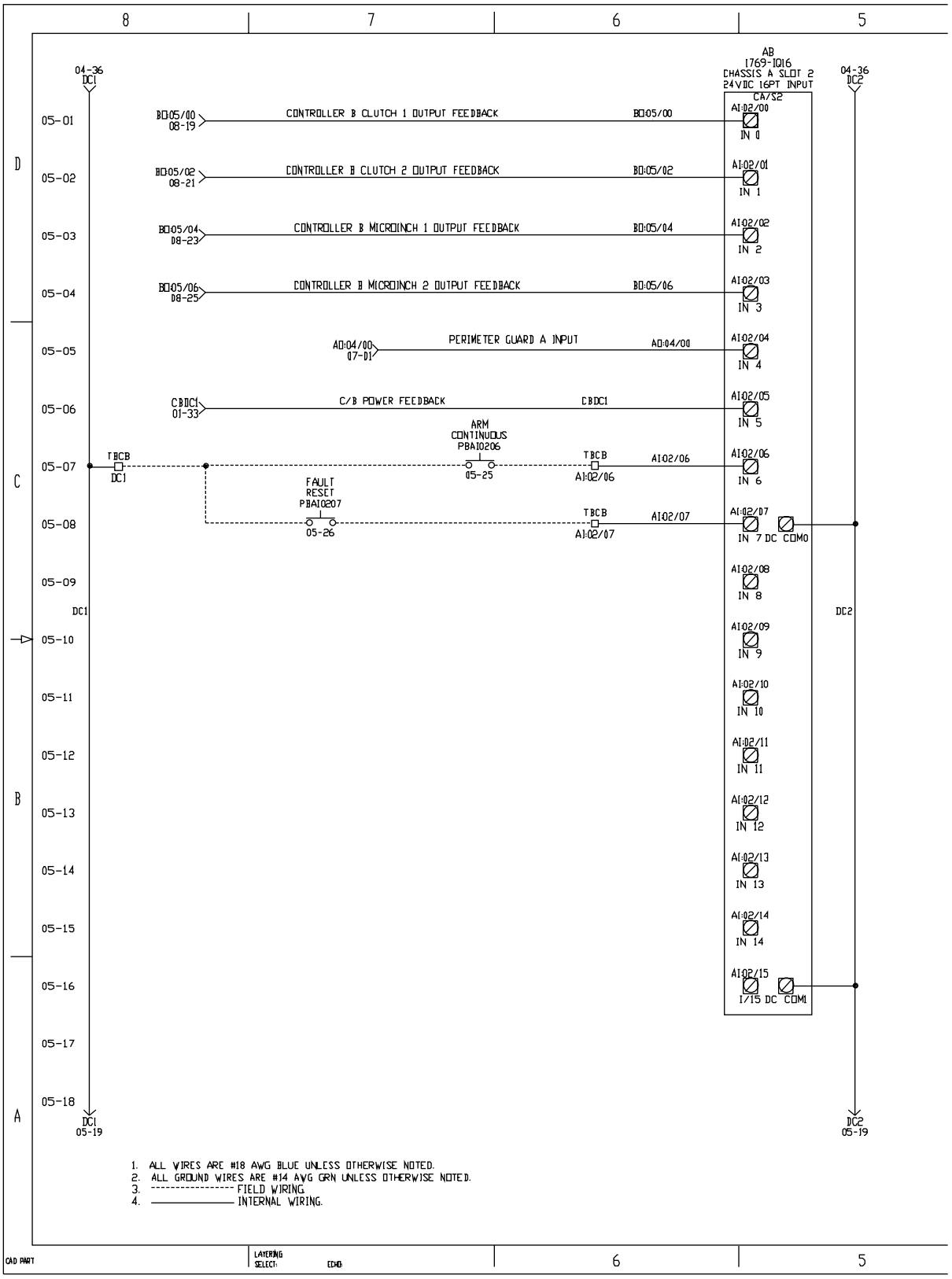
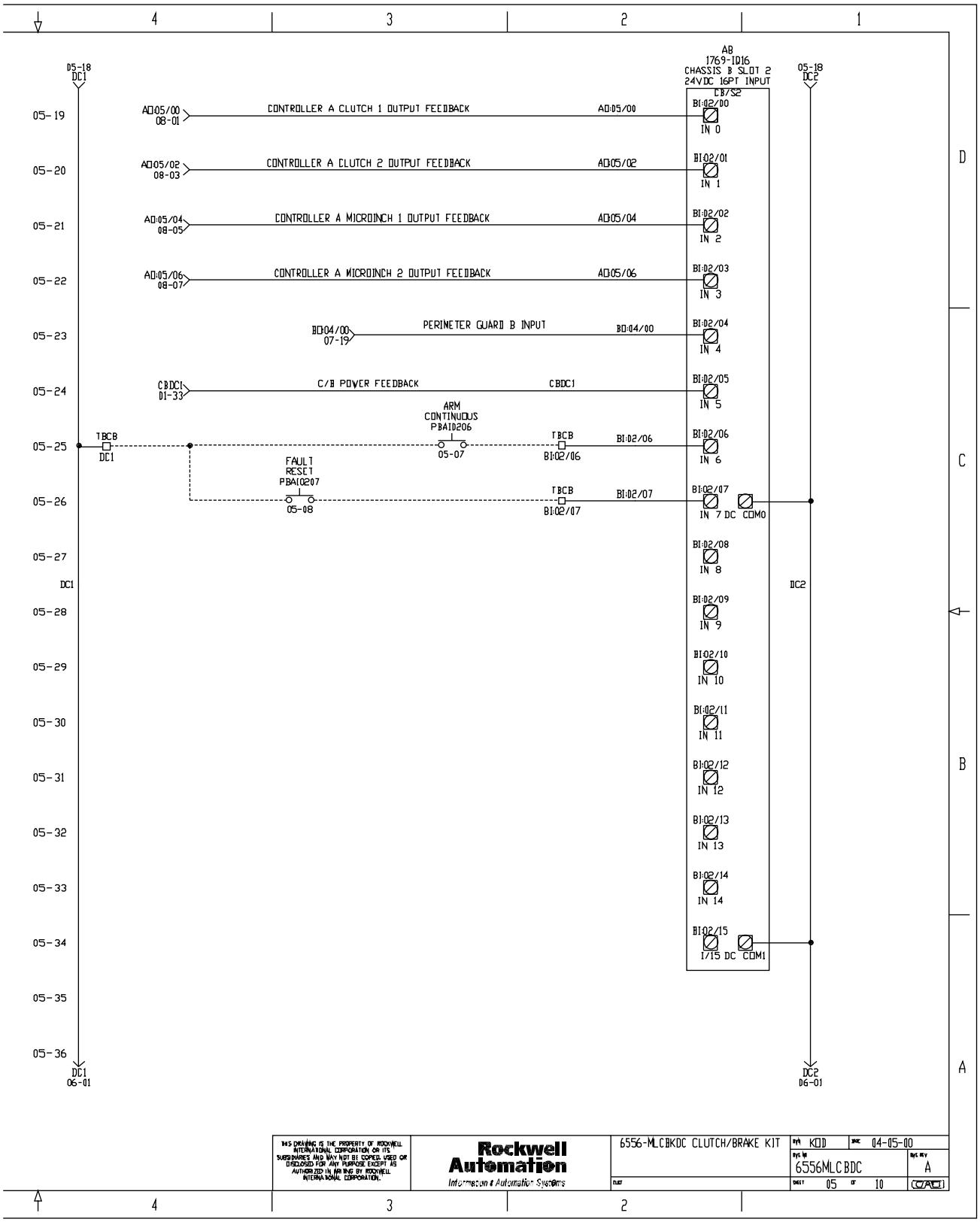
Rockwell Automation
Information & Automation Systems
6556-MLCBKDC CLUTCH/BRAKE KIT
KDD
04-05-00
6556MLCBDC
A
03
10


8
7
6
5
D
C
B
A
01-36 DC1
MODE SELECT KSAID100
OFF
INCH
SINGLE STROKE CONT.
MICRO INCH
AB 1769-IQ16 CHASSIS A SLOT 1 24VDC 16PT INPUT CA/S1
01-36 DC2
04-01
04-02
04-03
04-04
04-05
04-06
04-07
04-08
04-09
04-10
04-11
04-12
04-13
04-14
04-15
04-16
04-17
04-18
TBCB DC1
TBCB AI:01/00
AI:01/00 IN 0
AI:01/01 IN 1
AI:01/02 IN 2
AI:01/03 IN 3
AI:01/04 IN 4
AI:01/05 IN 5
AI:01/06 IN 6
AI:01/07 IN 7 DC COM0
AI:01/08 IN 8
AI:01/09 IN 9
AI:01/10 IN 10
AI:01/11 IN 11
AI:01/12 IN 12
AI:01/13 IN 13
AI:01/14 IN 14
AI:01/15 I/15 DC COM1
ANTI-REPEAT CAM (ACAM) LSA10105
04-19
BRAKE MONITOR CAM (BCAM) LSA10106
TOP STOP CAM (TCAM) LSA10107
MOTION DETECT CR
MAIN MOTOR FORWARD MF
TOP STOP PBAID207
C/B AIR PRESSURE PSAID208
CONTROL RESET SR1
33
34
D1-25
CONTROLLER A SEAL RELAY CRA00301
07-02
CONTROLLER B OK RELAY CRB00302
D7-21
CONTROLLER A OK RELAY FEEDBACK
107
01-33
AI:00/00
AI:02/06
AI:02/07
AI:02/01
AI:01/12
AI:01/13
AI:01/14
AI:01/15
DC1 04-19
DC2 04-19
1. ALL WIRES ARE #18 AWG BLUE UNLESS OTHERWISE NOTED.
2. ALL GROUND WIRES ARE #14 AWG GRN UNLESS OTHERWISE NOTED.
3. ---------- FIELD WIRING.
4. ———— INTERNAL WIRING.
CAD PART
LAYERING SELECT:
EDMD


AB
1769-IQ16
CHASSIS B SLOT 1
24VDC 16PT INPUT
CB/SI
04-18
DC1
04-18
DC2
04-06
OFF
SINGLE
INCH
STROKE CONT.
MICRO
INCH
TBCB
DC1
TBCH
BI:01/00
BI:01/01
BI:01/02
BI:01/03
BI:01/04
BI:01/05
BI:01/06
BI:01/07
BI:01/08
BI:01/09
BI:01/10
BI:01/11
BI:01/12
BI:01/13
BI:01/14
BI:01/15
IN 0
IN 1
IN 2
IN 3
IN 4
IN 5
IN 6
IN 7 DC COM0
IN 8
IN 9
IN 10
IN 11
IN 12
IN 13
IN 14
I/15 DC COM1
ANTI-REPEAT CAM
(ACAM)
LSBI0105
BRAKE MONITOR CAM
(BCAM)
LSBI0106
TOP STOP CAM
(TCAM)
LSBI0107
MOTION
DETECT
CR
AI:00/00
AI:00/00
MAIN MOTOR
FORWARD
MF
BI:02/06
BI:02/06
TOP
STOP
PBAI0207
BI:02/07
BI:02/07
C/B AIR
PRESSURE
PSAI0208
BI:02/08
BI:02/08
CONTROL
RESET
43
SR1
44
01-25
BI:01/12
CONTROLLER B
SEAL RELAY
CRBO0301
07-20
BI:01/13
CONTROLLER A
OK RELAY
CRAO0302
07-01
BI:01/14
CONTROLLER B OK RELAY FEEDBACK
108
01-33
108
DC2
05-01
DC1
05-01
6556-NLCBKDC CLUTCH/BRAKE KIT
KOD
04-05-00
6556MLCBDC
A
04
10
Rockwell
Automation
Information & Automation Systems


8
7
6
5
AB
1769-IQ16
CHASSIS A SLOT 2
24VDC 16PT INPUT
CA/S2
04-36
DC1
04-36
DC2
05-01
05-02
05-03
05-04
05-05
05-06
05-07
05-08
05-09
05-10
05-11
05-12
05-13
05-14
05-15
05-16
05-17
05-18
B0:05/00
08-19
CONTROLLER B CLUTCH 1 OUTPUT FEEDBACK
B0:05/00
AI:02/00
IN 0
B0:05/02
08-21
CONTROLLER B CLUTCH 2 OUTPUT FEEDBACK
B0:05/02
AI:02/01
IN 1
B0:05/04
08-23
CONTROLLER B MICRO/INCH 1 OUTPUT FEEDBACK
B0:05/04
AI:02/02
IN 2
B0:05/06
08-25
CONTROLLER B MICRO/INCH 2 OUTPUT FEEDBACK
B0:05/06
AI:02/03
IN 3
A0:04/00
07-01
PERIMETER GUARD A INPUT
A0:04/00
AI:02/04
IN 4
CBDC1
01-33
C/B POWER FEEDBACK
CBDC1
AI:02/05
IN 5
TBCB
DC1
ARM
CONTINUOUS
PBA10206
05-25
TBCB
AI:02/06
AI:02/06
IN 6
FAULT
RESET
PBA10207
05-26
TBCB
AI:02/07
AI:02/07
IN 7 DC COM0
AI:02/08
IN 8
AI:02/09
IN 9
AI:02/10
IN 10
AI:02/11
IN 11
AI:02/12
IN 12
AI:02/13
IN 13
AI:02/14
IN 14
AI:02/15
I/15 DC COM1
DC1
DC2
DC1
05-19
DC2
05-19
1. ALL WIRES ARE #18 AWG BLUE UNLESS OTHERWISE NOTED.
2. ALL GROUND WIRES ARE #14 AWG GRN UNLESS OTHERWISE NOTED.
3. ---------- FIELD WIRING.
4. ———————— INTERNAL WIRING.
CAD PART
LAYERING
SELECT:
ECAD:


4
3
2
1
AB
1769-IQ16
CHASSIS B SLOT 2
24VDC 16PT INPUT
CB/S2
05-18
DC1
05-18
DC2
05-19
05-20
05-21
05-22
05-23
05-24
05-25
05-26
05-27
05-28
05-29
05-30
05-31
05-32
05-33
05-34
05-35
05-36
AD:05/00
08-01
CONTROLLER A CLUTCH 1 OUTPUT FEEDBACK
AD:05/00
BI:02/00
IN 0
AD:05/02
08-03
CONTROLLER A CLUTCH 2 OUTPUT FEEDBACK
AD:05/02
BI:02/01
IN 1
AD:05/04
08-05
CONTROLLER A MICROINCH 1 OUTPUT FEEDBACK
AD:05/04
BI:02/02
IN 2
AD:05/06
08-07
CONTROLLER A MICROINCH 2 OUTPUT FEEDBACK
AD:05/06
BI:02/03
IN 3
BI:04/00
07-19
PERIMETER GUARD B INPUT
BI:04/00
BI:02/04
IN 4
CBDC1
01-33
C/B POWER FEEDBACK
CBDC1
BI:02/05
IN 5
TBCB
DC1
ARM
CONTINUOUS
PBAI0206
05-07
TBCB
BI:02/06
BI:02/06
IN 6
FAULT
RESET
PBAI0207
05-08
TBCB
BI:02/07
BI:02/07
IN 7 DC COM0
BI:02/08
IN 8
BI:02/09
IN 9
BI:02/10
IN 10
BI:02/11
IN 11
BI:02/12
IN 12
BI:02/13
IN 13
BI:02/14
IN 14
BI:02/15
I/15 DC COM1
DC1
06-01
DC2
06-01
D
C
B
A
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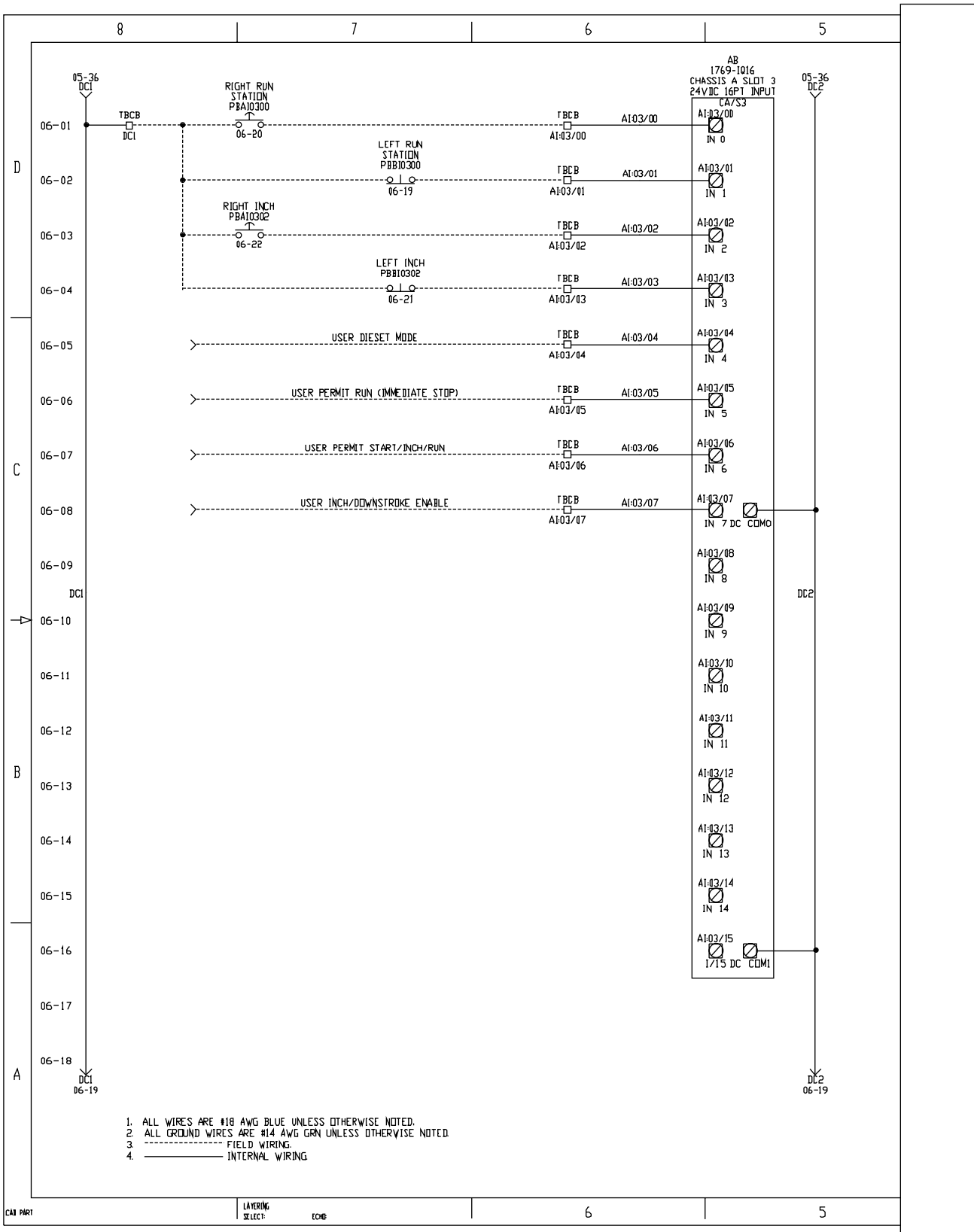
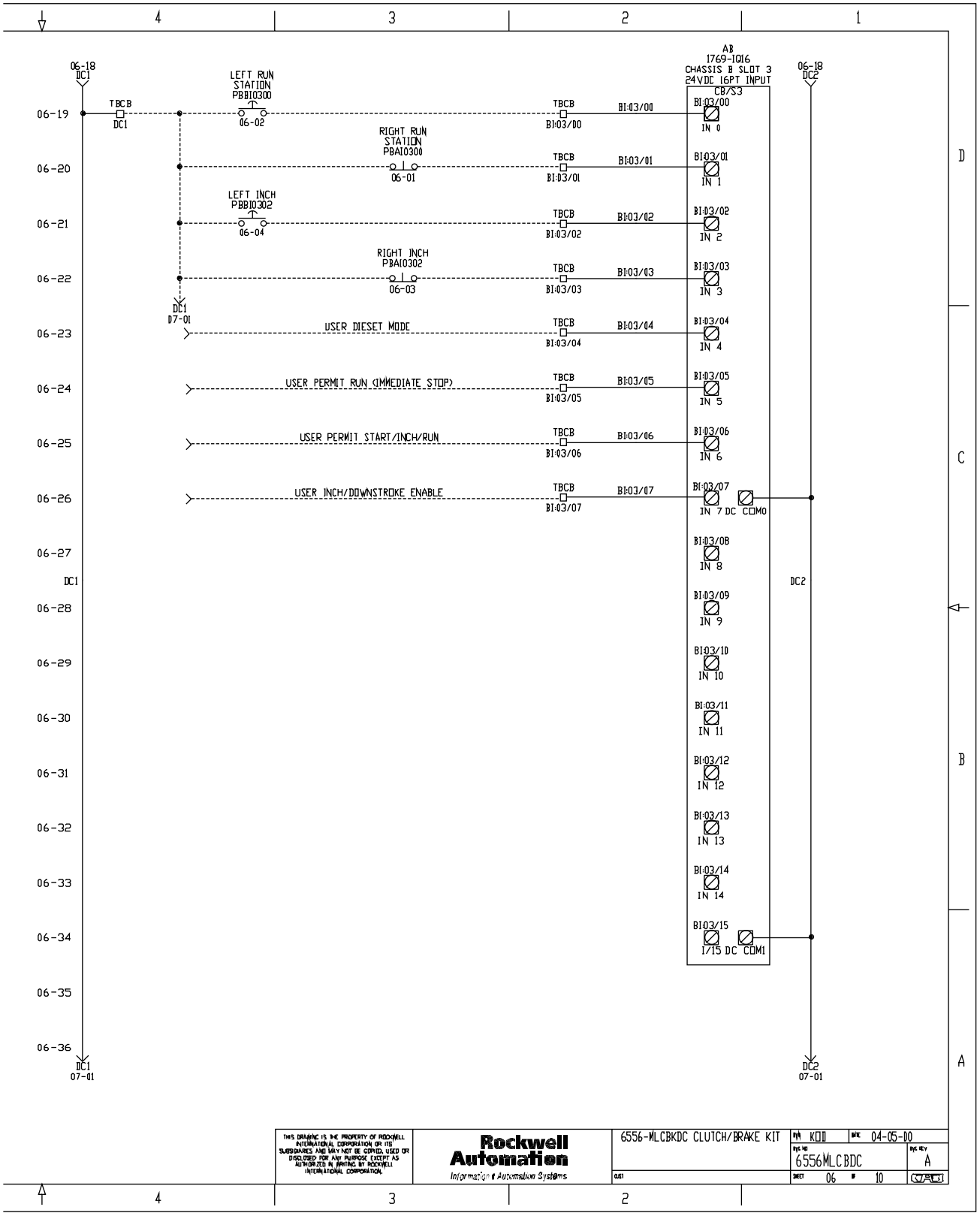
Rockwell Automation
Information & Automation Systems
6556-MLCBKDC CLUTCH/BRAKE KIT
KDD
04-05-00
6556MLCBDC
A
05
10


8
7
6
5
D
C
B
A
05-36
DC1
RIGHT RUN
STATION
PBA10300
06-20
TBCB
DC1
LEFT RUN
STATION
PBB10300
06-19
RIGHT INCH
PBA10302
06-22
LEFT INCH
PBB10302
06-21
USER DIESET MODE
USER PERMIT RUN (IMMEDIATE STOP)
USER PERMIT START/INCH/RUN
USER INCH/DOWNSTROKE ENABLE
AB
1769-IQ16
CHASSIS A SLOT 3
24VDC 16PT INPUT
CA/S3
05-36
DC2
06-01
06-02
06-03
06-04
06-05
06-06
06-07
06-08
06-09
06-10
06-11
06-12
06-13
06-14
06-15
06-16
06-17
06-18
AI:03/00
AI:03/01
AI:03/02
AI:03/03
AI:03/04
AI:03/05
AI:03/06
AI:03/07
AI:03/08
AI:03/09
AI:03/10
AI:03/11
AI:03/12
AI:03/13
AI:03/14
AI:03/15
IN 0
IN 1
IN 2
IN 3
IN 4
IN 5
IN 6
IN 7 DC COM0
IN 8
IN 9
IN 10
IN 11
IN 12
IN 13
IN 14
1/15 DC COM1
DC1
06-19
DC2
06-19
1. ALL WIRES ARE #18 AWG BLUE UNLESS OTHERWISE NOTED.
2. ALL GROUND WIRES ARE #14 AWG GRN UNLESS OTHERWISE NOTED.
3. ---------- FIELD WIRING.
4. ———— INTERNAL WIRING.
CAD PART
LAYERING
SELECT:
ECAD


4
3
2
1
AB
1769-IQ16
CHASSIS # SLOT 3
24VDC 16PT INPUT
C8/S3
06-18
DC1
06-18
DC2
LEFT RUN
STATION
PBBI0300
RIGHT RUN
STATION
PBAI0300
LEFT INCH
PBBI0302
RIGHT INCH
PBAI0302
TBCB
DC1
06-02
06-01
06-04
06-03
BI:03/00
IN 0
BI:03/01
IN 1
BI:03/02
IN 2
BI:03/03
IN 3
BI:03/04
IN 4
BI:03/05
IN 5
BI:03/06
IN 6
BI:03/07
IN 7 DC COM0
BI:03/08
IN 8
BI:03/09
IN 9
BI:03/10
IN 10
BI:03/11
IN 11
BI:03/12
IN 12
BI:03/13
IN 13
BI:03/14
IN 14
BI:03/15
I/15 DC COM1
DC1
07-01
USER DIESET MODE
USER PERMIT RUN (IMMEDIATE STOP)
USER PERMIT START/INCH/RUN
USER INCH/DOWNSTROKE ENABLE
06-19
06-20
06-21
06-22
06-23
06-24
06-25
06-26
06-27
06-28
06-29
06-30
06-31
06-32
06-33
06-34
06-35
06-36
D
C
B
A
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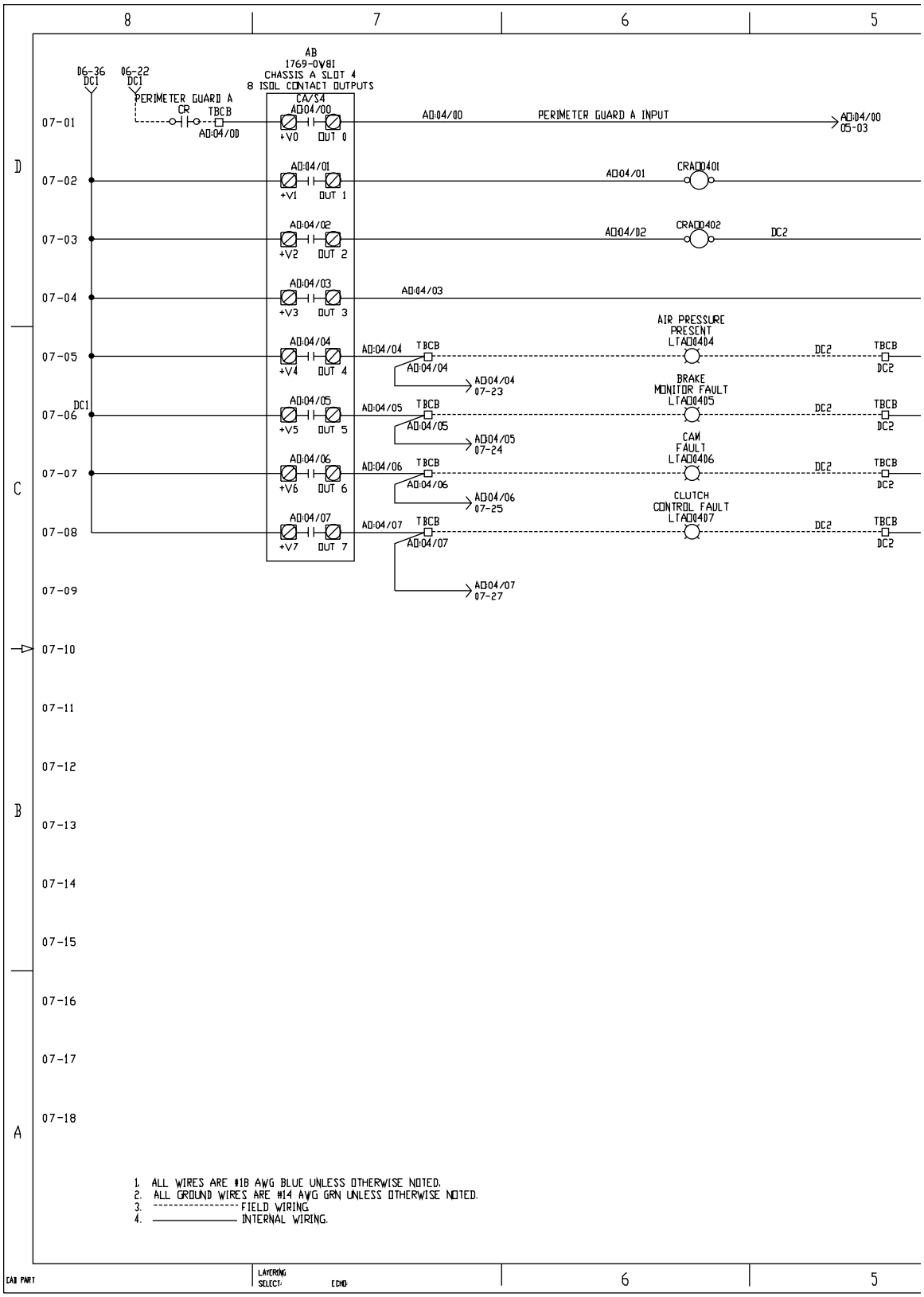
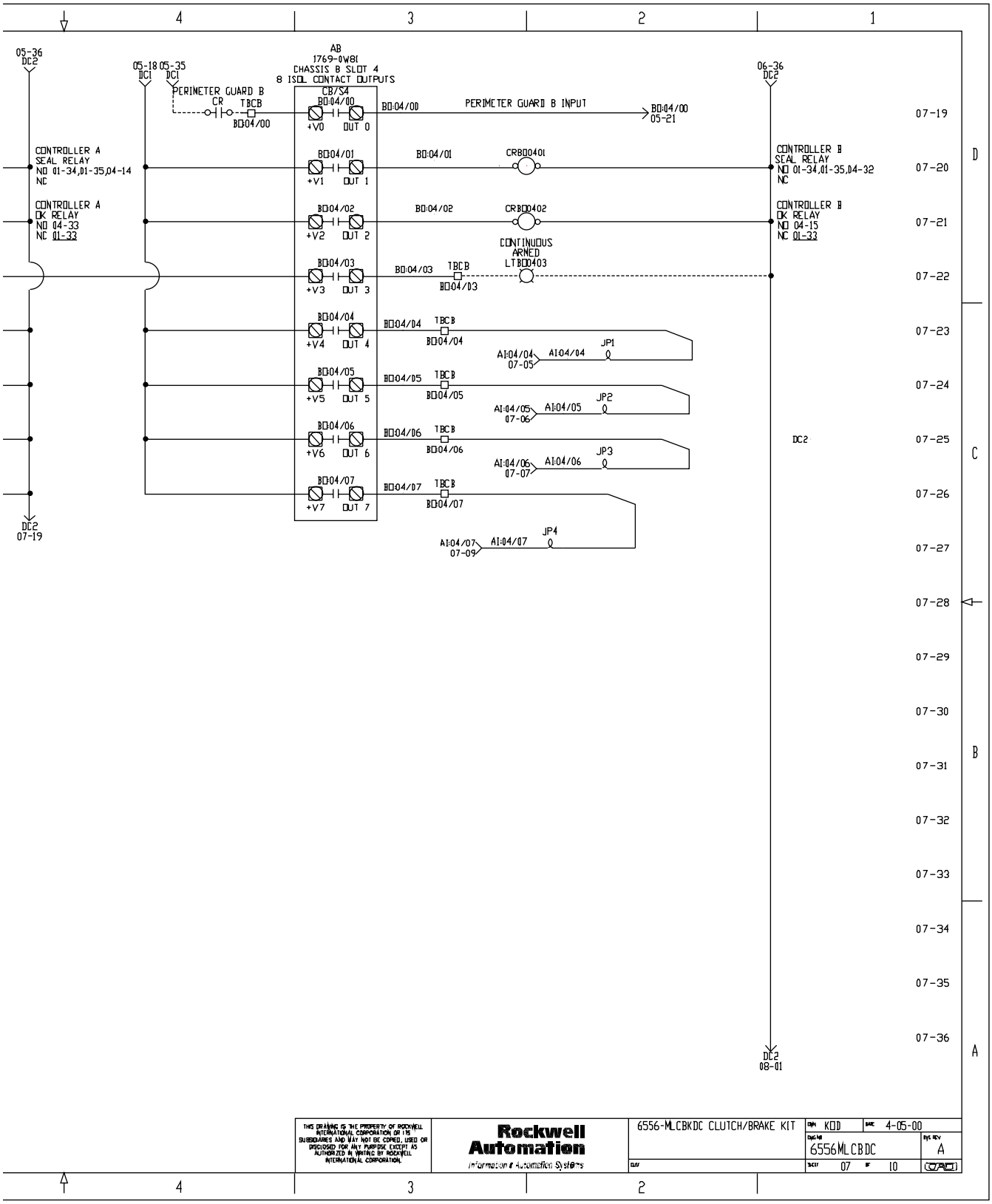
Rockwell Automation
Information & Automation Systems
6556-MLCBKDC CLUTCH/BRAKE KIT
BY KDD
DATE 04-05-00
DWG NO 6556MLCBDC
DWG REV A
SHEET 06 OF 10


8
7
6
5
AB
1769-OV8I
CHASSIS A SLOT 4
8 ISOL CONTACT OUTPUTS
CA/S4
06-36
DC1
06-22
DC1
PERIMETER GUARD A
CR
TBCB
A□:04/00
A□:04/00
+V0
OUT 0
PERIMETER GUARD A INPUT
A□:04/00
05-03
A□:04/01
+V1
OUT 1
A□:04/01
CRA□0401
A□:04/02
+V2
OUT 2
A□:04/02
CRA□0402
DC2
A□:04/03
+V3
OUT 3
A□:04/03
A□:04/04
+V4
OUT 4
A□:04/04
TBCB
A□:04/04
A□:04/04
07-23
AIR PRESSURE
PRESENT
LTA□0404
DC2
TBCB
DC2
DC1
A□:04/05
+V5
OUT 5
A□:04/05
TBCB
A□:04/05
A□:04/05
07-24
BRAKE
MONITOR FAULT
LTA□0405
DC2
TBCB
DC2
A□:04/06
+V6
OUT 6
A□:04/06
TBCB
A□:04/06
A□:04/06
07-25
CAM
FAULT
LTA□0406
DC2
TBCB
DC2
A□:04/07
+V7
OUT 7
A□:04/07
TBCB
A□:04/07
A□:04/07
07-27
CLUTCH
CONTROL FAULT
LTA□0407
DC2
TBCB
DC2
D
C
B
A
07-01
07-02
07-03
07-04
07-05
07-06
07-07
07-08
07-09
07-10
07-11
07-12
07-13
07-14
07-15
07-16
07-17
07-18
1. ALL WIRES ARE #18 AWG BLUE UNLESS OTHERWISE NOTED.
2. ALL GROUND WIRES ARE #14 AWG GRN UNLESS OTHERWISE NOTED.
3. ---------- FIELD WIRING.
4. ———— INTERNAL WIRING.
CAD PART
LAYERING
SELECT:
EDMD
6
5


4
3
2
1
05-36
DC2
05-18
DC1
05-35
DC1
AB
1769-OW8I
CHASSIS B SLOT 4
8 ISOL CONTACT OUTPUTS
CB/S4
PERIMETER GUARD B
CR
TBCB
B□:04/00
+V0
OUT 0
B□:04/00
PERIMETER GUARD B INPUT
B□:04/00
05-21
06-36
DC2
CONTROLLER A
SEAL RELAY
NO 01-34,01-35,04-14
NC
B□:04/01
+V1
OUT 1
CRB□0401
CONTROLLER B
SEAL RELAY
NO 01-34,01-35,04-32
NC
CONTROLLER A
OK RELAY
NO 04-33
NC 01-33
B□:04/02
+V2
OUT 2
B□:04/02
CRB□0402
CONTROLLER B
OK RELAY
NO 04-15
NC 01-33
B□:04/03
+V3
OUT 3
B□:04/03
TBCB
B□:04/03
CONTINUOUS
ARMED
LTB□0403
B□:04/04
+V4
OUT 4
B□:04/04
TBCB
B□:04/04
AI:04/04
07-05
AI:04/04
JP1
B□:04/05
+V5
OUT 5
B□:04/05
TBCB
B□:04/05
AI:04/05
07-06
AI:04/05
JP2
B□:04/06
+V6
OUT 6
B□:04/06
TBCB
B□:04/06
AI:04/06
07-07
AI:04/06
JP3
DC2
B□:04/07
+V7
OUT 7
B□:04/07
TBCB
B□:04/07
AI:04/07
07-09
AI:04/07
JP4
DC2
07-19
DC2
08-01
07-19
07-20
07-21
07-22
07-23
07-24
07-25
07-26
07-27
07-28
07-29
07-30
07-31
07-32
07-33
07-34
07-35
07-36
D
C
B
A
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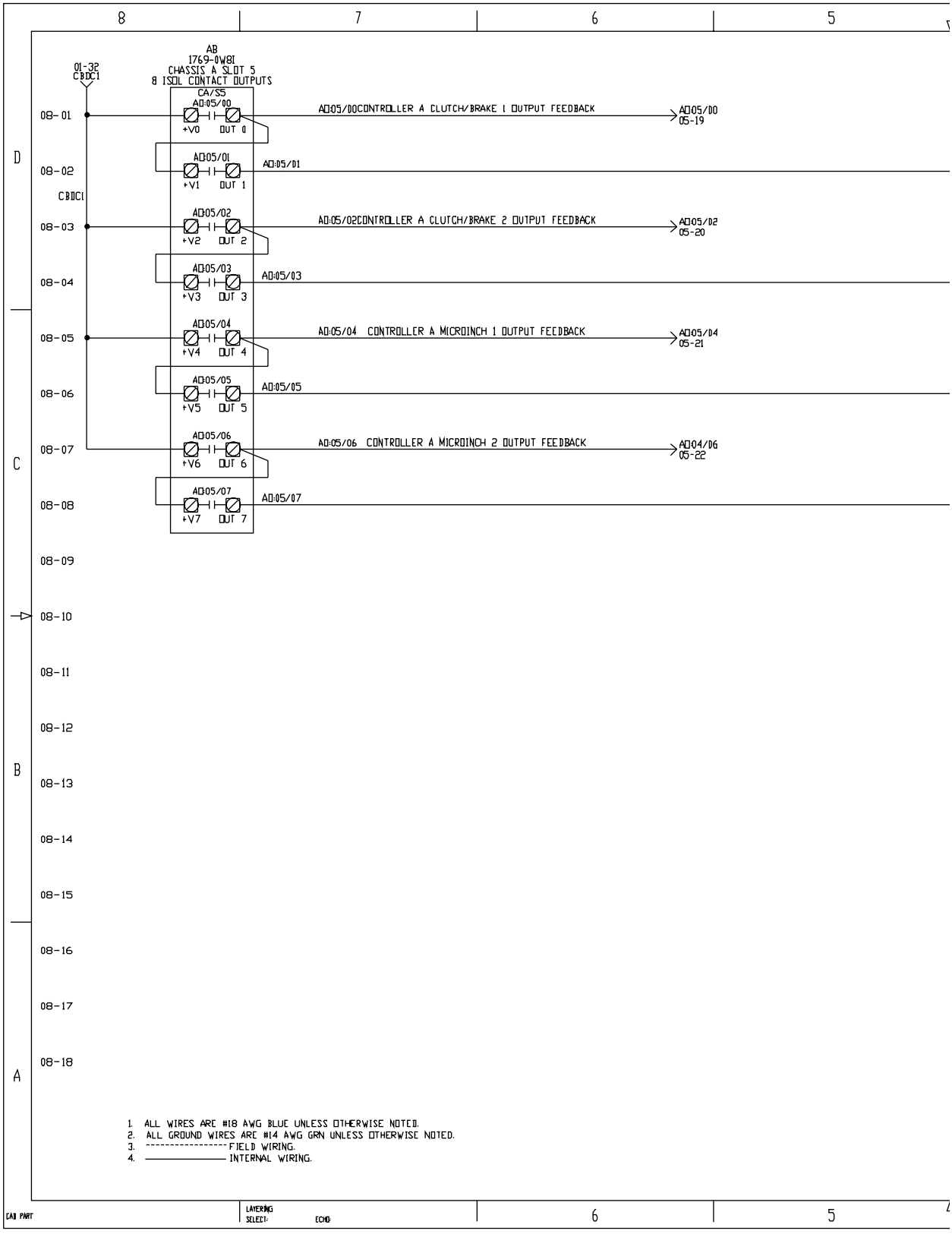
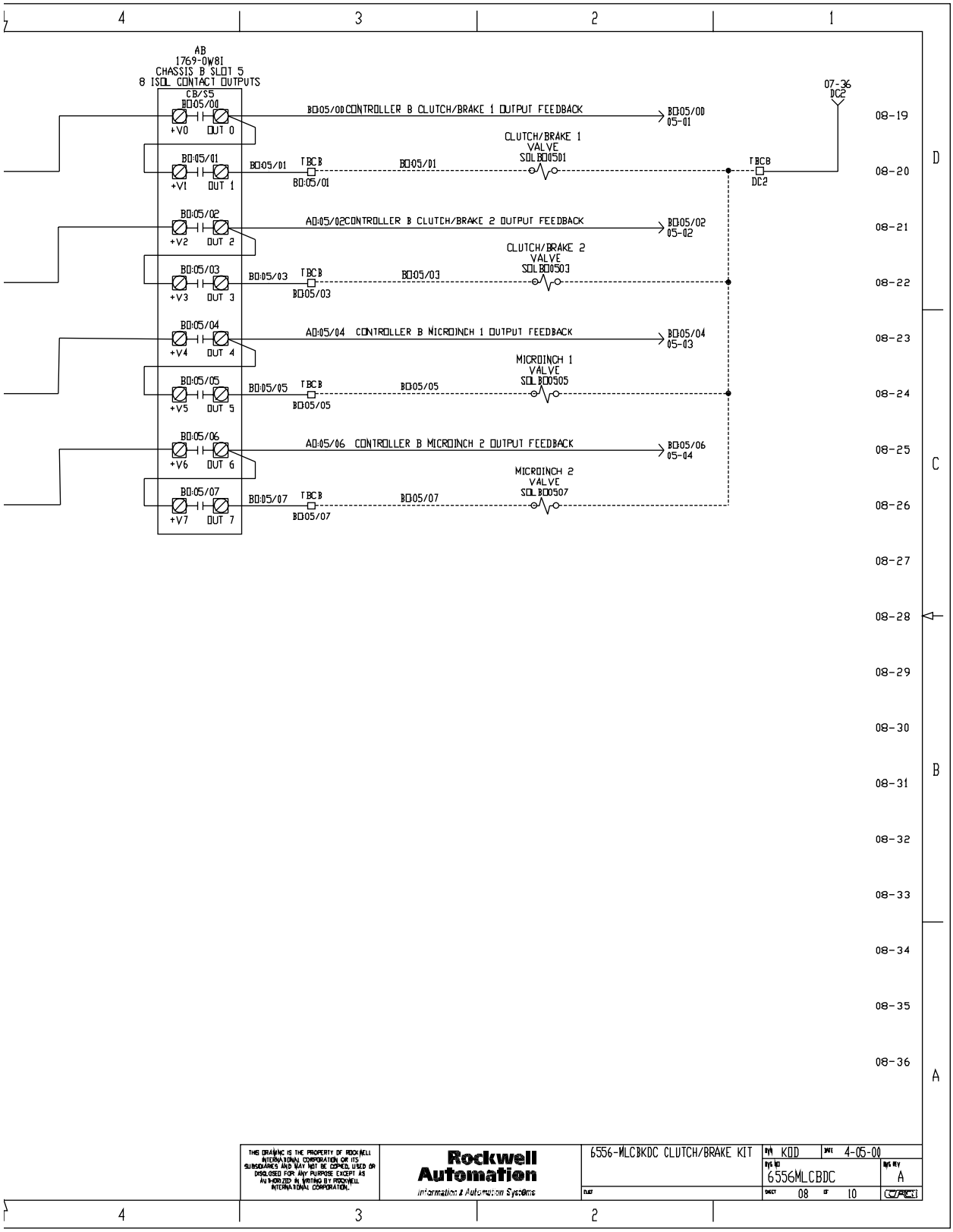
Rockwell Automation
Information & Automation Systems
6556-MLCBKDC CLUTCH/BRAKE KIT
KDD
4-05-00
6556MLCBDC
A
07
10


8
7
6
5
AB
1769-OW8I
CHASSIS A SLOT 5
8 ISOL CONTACT OUTPUTS
01-32
CBDC1
CA/S5
AD:05/00
+V0
OUT 0
AD:05/00CONTROLLER A CLUTCH/BRAKE 1 OUTPUT FEEDBACK
AD:05/00
05-19
AD:05/01
+V1
OUT 1
AD:05/01
CBDC1
AD:05/02
+V2
OUT 2
AD:05/02CONTROLLER A CLUTCH/BRAKE 2 OUTPUT FEEDBACK
AD:05/02
05-20
AD:05/03
+V3
OUT 3
AD:05/03
AD:05/04
+V4
OUT 4
AD:05/04 CONTROLLER A MICRODINCH 1 OUTPUT FEEDBACK
AD:05/04
05-21
AD:05/05
+V5
OUT 5
AD:05/05
AD:05/06
+V6
OUT 6
AD:05/06 CONTROLLER A MICRODINCH 2 OUTPUT FEEDBACK
AD:04/06
05-22
AD:05/07
+V7
OUT 7
AD:05/07
08-01
08-02
08-03
08-04
08-05
08-06
08-07
08-08
08-09
08-10
08-11
08-12
08-13
08-14
08-15
08-16
08-17
08-18
D
C
B
A
1. ALL WIRES ARE #18 AWG BLUE UNLESS OTHERWISE NOTED.
2. ALL GROUND WIRES ARE #14 AWG GRN UNLESS OTHERWISE NOTED.
3. ---------- FIELD WIRING.
4. ———————— INTERNAL WIRING.
CAD PART
LAYERING
SELECT:
ECAD
6
5


4
3
2
1
AB
1769-OW8I
CHASSIS B SLOT 5
8 ISOL CONTACT OUTPUTS
CB/S5
B□:05/00
+V0 OUT 0
B□:05/00 CONTROLLER B CLUTCH/BRAKE 1 OUTPUT FEEDBACK
B□:05/00
05-01
07-36
DC2
B□:05/01
+V1 OUT 1
B□:05/01
TBCB
B□:05/01
B□:05/01
CLUTCH/BRAKE 1
VALVE
SOL B□0501
TBCB
DC2
B□:05/02
+V2 OUT 2
A□:05/02 CONTROLLER B CLUTCH/BRAKE 2 OUTPUT FEEDBACK
B□:05/02
05-02
B□:05/03
+V3 OUT 3
B□:05/03
TBCB
B□:05/03
B□:05/03
CLUTCH/BRAKE 2
VALVE
SOL B□0503
B□:05/04
+V4 OUT 4
A□:05/04 CONTROLLER B MICRO INCH 1 OUTPUT FEEDBACK
B□:05/04
05-03
B□:05/05
+V5 OUT 5
B□:05/05
TBCB
B□:05/05
B□:05/05
MICRO INCH 1
VALVE
SOL B□0505
B□:05/06
+V6 OUT 6
A□:05/06 CONTROLLER B MICRO INCH 2 OUTPUT FEEDBACK
B□:05/06
05-04
B□:05/07
+V7 OUT 7
B□:05/07
TBCB
B□:05/07
B□:05/07
MICRO INCH 2
VALVE
SOL B□0507
08-19
08-20
08-21
08-22
08-23
08-24
08-25
08-26
08-27
08-28
08-29
08-30
08-31
08-32
08-33
08-34
08-35
08-36
D
C
B
A
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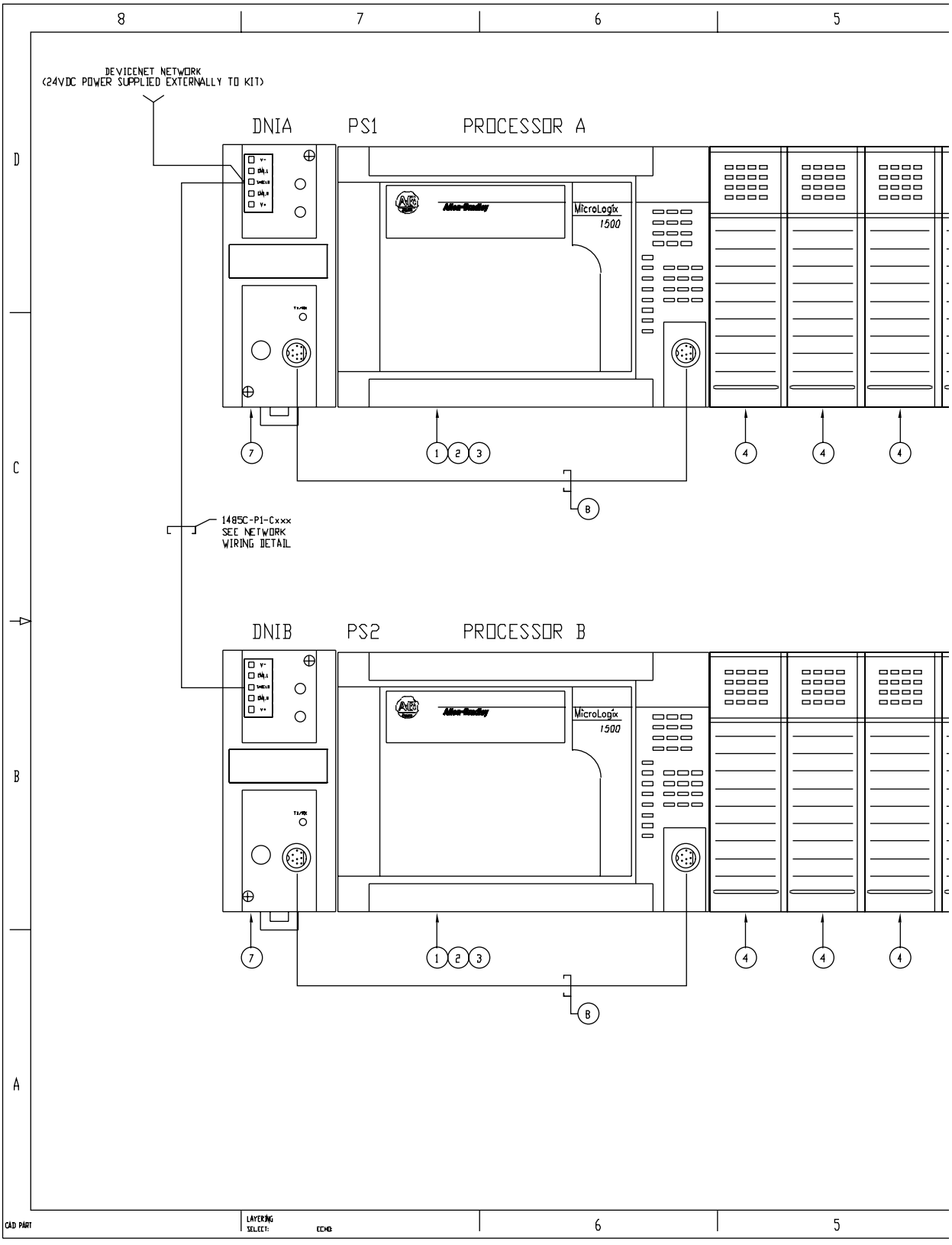
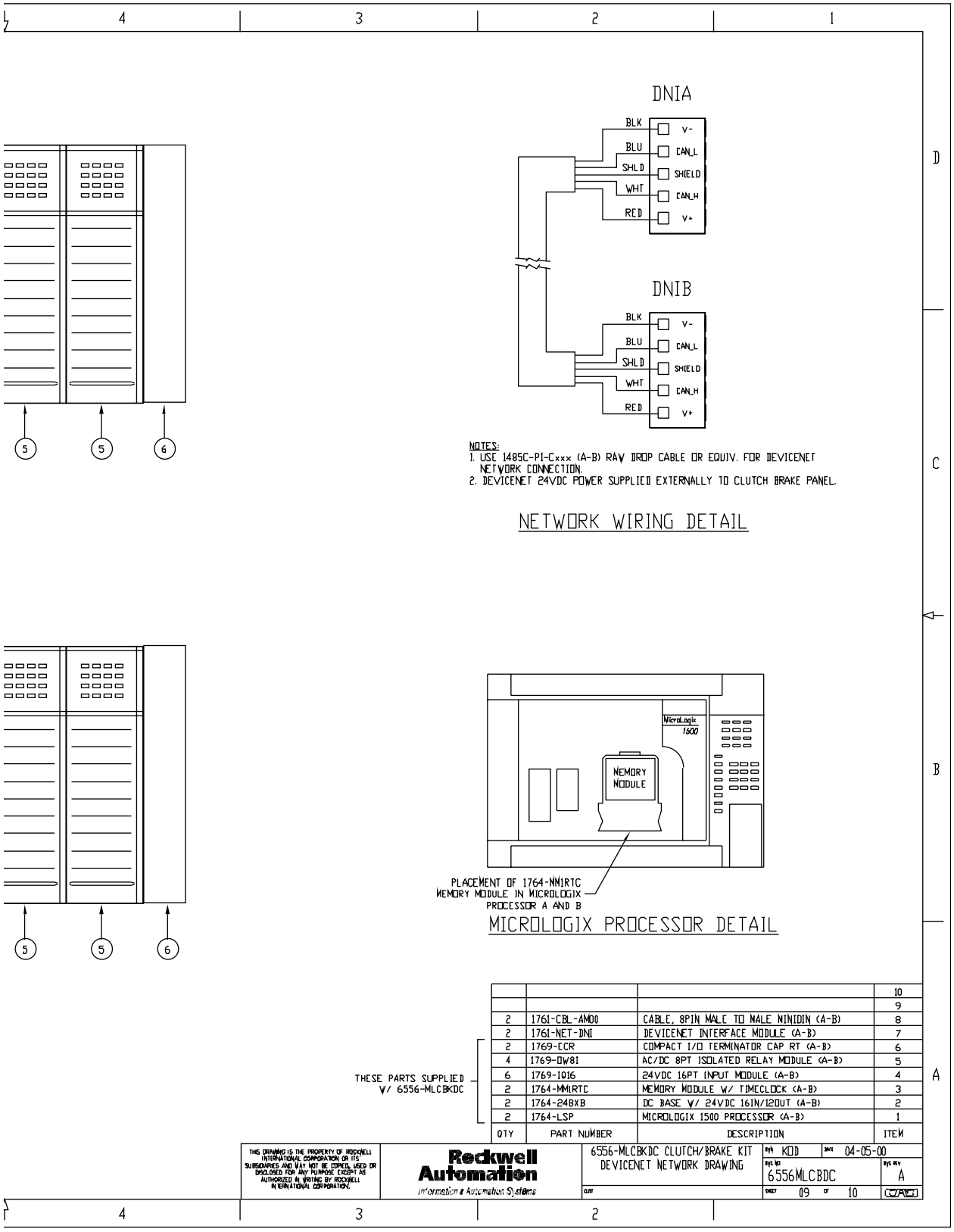
Rockwell Automation
Information & Automation Systems
6556-MLCBKDC CLUTCH/BRAKE KIT
DWN KDD
DATE 4-05-00
DWG NO 6556MLCBDC
DWG REV A
SHEET 08 OF 10
4
3
2


8
7
6
5
D
C
B
A
DEVICENET NETWORK
(24VDC POWER SUPPLIED EXTERNALLY TO KIT)
DNIA PS1 PROCESSOR A
MicroLogix 1500
1485C-P1-Cxxx
SEE NETWORK
WIRING DETAIL
DNIB PS2 PROCESSOR B
MicroLogix 1500
CAD PART
LAYERING SELECT:
ECMD:
6
5


4
3
2
1
D
C
B
A
DNIA
BLK
V-
BLU
CAN_L
SHLD
SHIELD
WHT
CAN_H
RED
V+
DNIB
BLK
V-
BLU
CAN_L
SHLD
SHIELD
WHT
CAN_H
RED
V+
5
5
6
NOTES:
1. USE 1485C-P1-Cxxx (A-B) RAW DROP CABLE OR EQUIV. FOR DEVICENET NETWORK CONNECTION.
2. DEVICENET 24VDC POWER SUPPLIED EXTERNALLY TO CLUTCH BRAKE PANEL.
NETWORK WIRING DETAIL
MicroLogix 1500
MEMORY MODULE
PLACEMENT OF 1764-MM1RTC MEMORY MODULE IN MICROLOGIX PROCESSOR A AND B
MICROLOGIX PROCESSOR DETAIL
THESE PARTS SUPPLIED W/ 6556-MLCBKDC
QTY
PART NUMBER
DESCRIPTION
ITEM
2 1761-CBL-AM00 CABLE, 8PIN MALE TO MALE MINIDIN (A-B) 8
2 1761-NET-DNI DEVICENET INTERFACE MODULE (A-B) 7
2 1769-ECR COMPACT I/O TERMINATOR CAP RT (A-B) 6
4 1769-OW8I AC/DC 8PT ISOLATED RELAY MODULE (A-B) 5
6 1769-IQ16 24VDC 16PT INPUT MODULE (A-B) 4
2 1764-MM1RTC MEMORY MODULE W/ TIMECLOCK (A-B) 3
2 1764-24BXB DC BASE W/ 24VDC 16IN/12OUT (A-B) 2
2 1764-LSP MICROLOGIX 1500 PROCESSOR (A-B) 1
10
9
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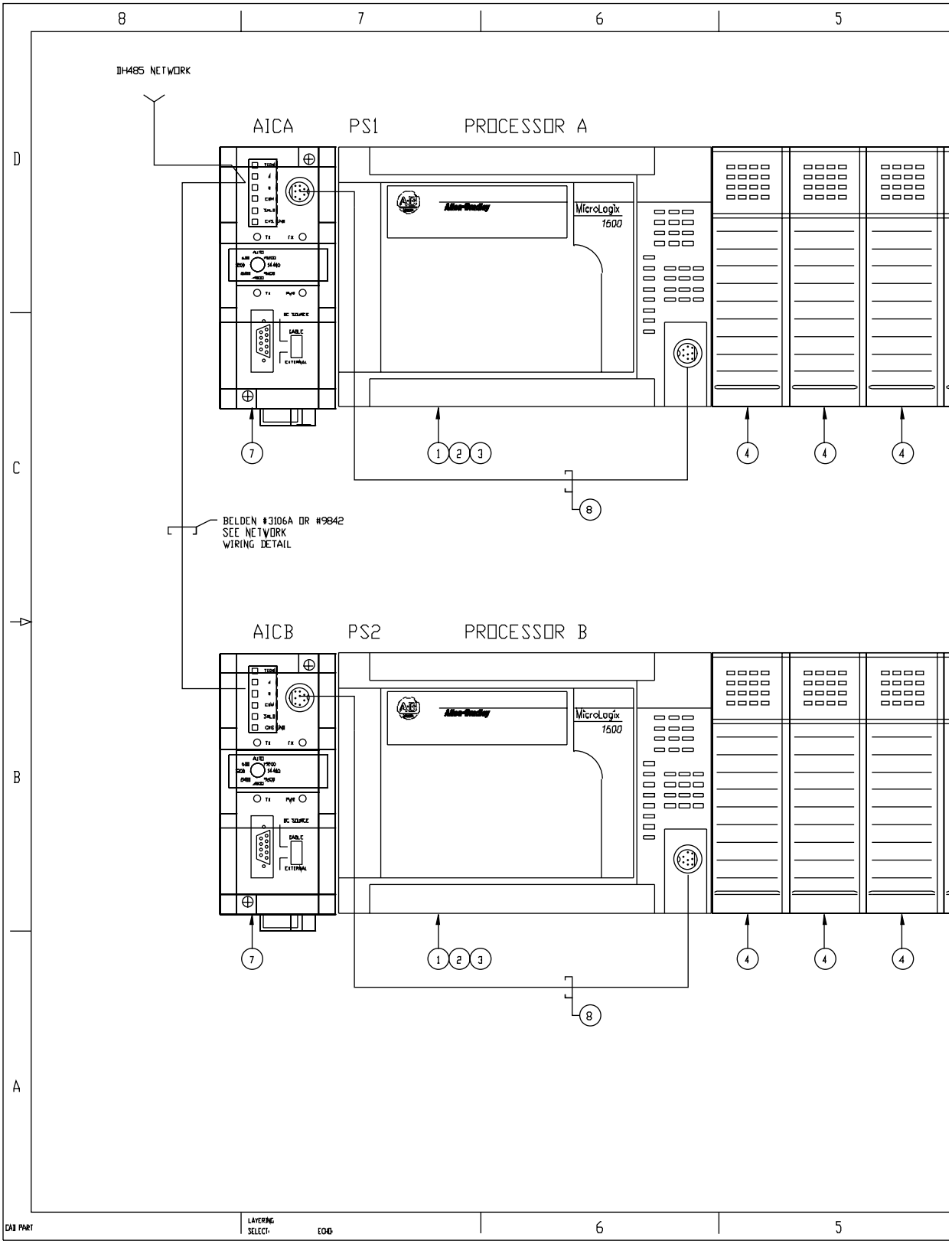
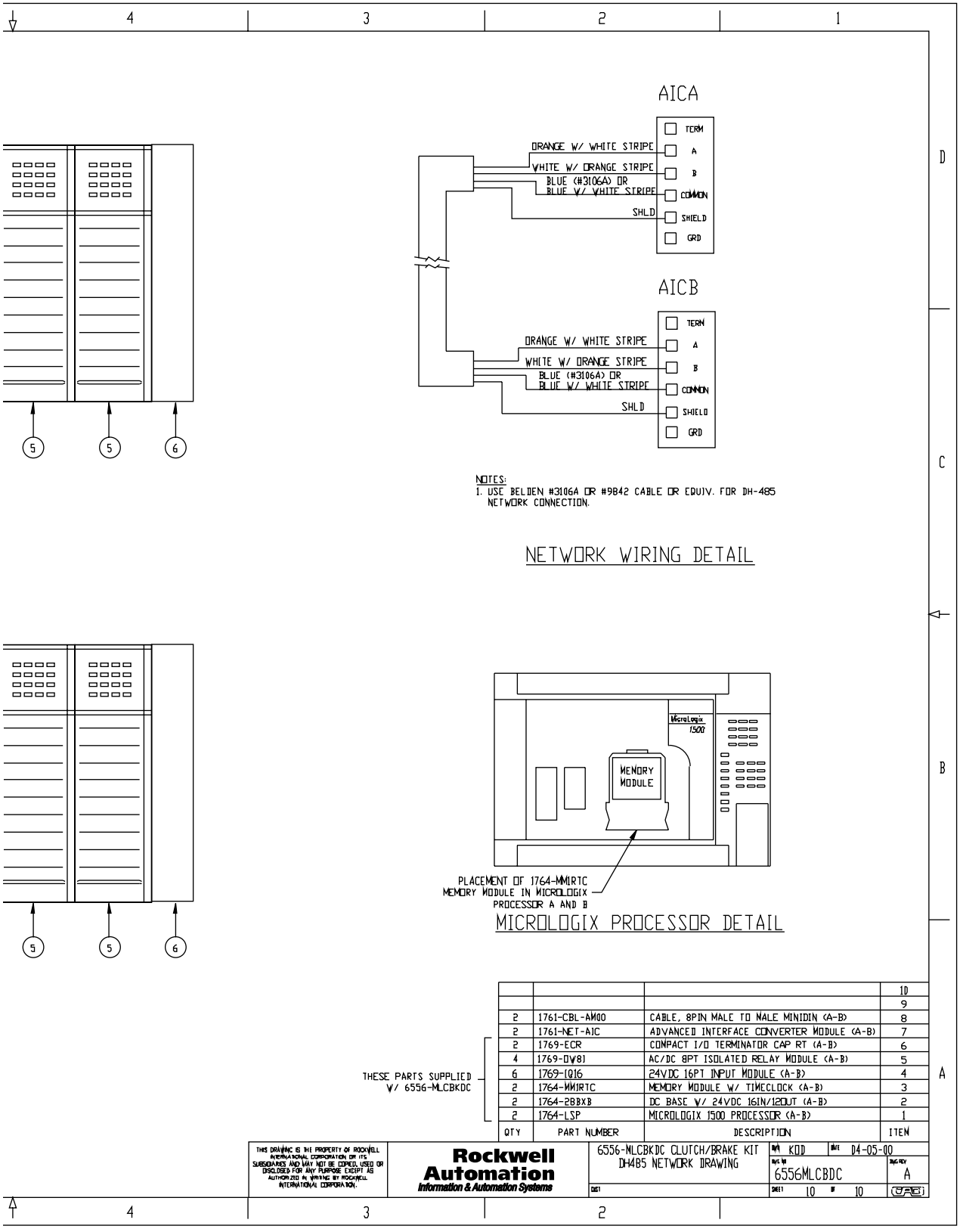
Rockwell Automation
Information & Automation Systems
6556-MLCBKDC CLUTCH/BRAKE KIT DEVICENET NETWORK DRAWING
PVA KDD
DWT 04-05-00
DWG NO 6556MLCBDC
DWG REV A
SHEET 09 OF 10


8
7
6
5
D
C
B
A
DH485 NETWORK
A1CA PS1 PROCESSOR A
MicroLogix 1500
BELDEN #3106A OR #9842
SEE NETWORK
WIRING DETAIL
A1CB PS2 PROCESSOR B
MicroLogix 1500
LAYERING SELECT:
6
5


AICA
TERM
A
B
COMMON
SHIELD
GRD
ORANGE W/ WHITE STRIPE
WHITE W/ ORANGE STRIPE
BLUE (#3106A) OR
BLUE W/ WHITE STRIPE
SHLD
AICB
TERM
A
B
COMMON
SHIELD
GRD
ORANGE W/ WHITE STRIPE
WHITE W/ ORANGE STRIPE
BLUE (#3106A) OR
BLUE W/ WHITE STRIPE
SHLD
5
5
6
NOTES:
1. USE BELDEN #3106A OR #9842 CABLE OR EQUIV. FOR DH-485 NETWORK CONNECTION.
NETWORK WIRING DETAIL
MicroLogix 1500
MEMORY MODULE
PLACEMENT OF 1764-MMIRTC MEMORY MODULE IN MICROLOGIX PROCESSOR A AND B
MICROLOGIX PROCESSOR DETAIL
THESE PARTS SUPPLIED W/ 6556-MLCBKDC
QTY | PART NUMBER | DESCRIPTION | ITEM
2 | 1761-CBL-AM00 | CABLE, 8PIN MALE TO MALE MINIDIN (A-B) | 8
2 | 1761-NET-AIC | ADVANCED INTERFACE CONVERTER MODULE (A-B) | 7
2 | 1769-ECR | COMPACT I/O TERMINATOR CAP RT (A-B) | 6
4 | 1769-OW8I | AC/DC 8PT ISOLATED RELAY MODULE (A-B) | 5
6 | 1769-IQ16 | 24VDC 16PT INPUT MODULE (A-B) | 4
2 | 1764-MMIRTC | MEMORY MODULE W/ TIMECLOCK (A-B) | 3
2 | 1764-28BXB | DC BASE W/ 24VDC 16IN/12OUT (A-B) | 2
2 | 1764-LSP | MICROLOGIX 1500 PROCESSOR (A-B) | 1
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Rockwell Automation
Information & Automation Systems
6556-MLCBKDC CLUTCH/BRAKE KIT DH485 NETWORK DRAWING
DWN KDD
DATE 04-05-00
DWG NO 6556MLCBDC
REV A
SHEET 10 OF 10

Notes:

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Publication 6556-UM001B-EN-P – November, 2000 PN 957293-25
Supersedes Publication 6556-UM001A-EN-P – August 2000
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